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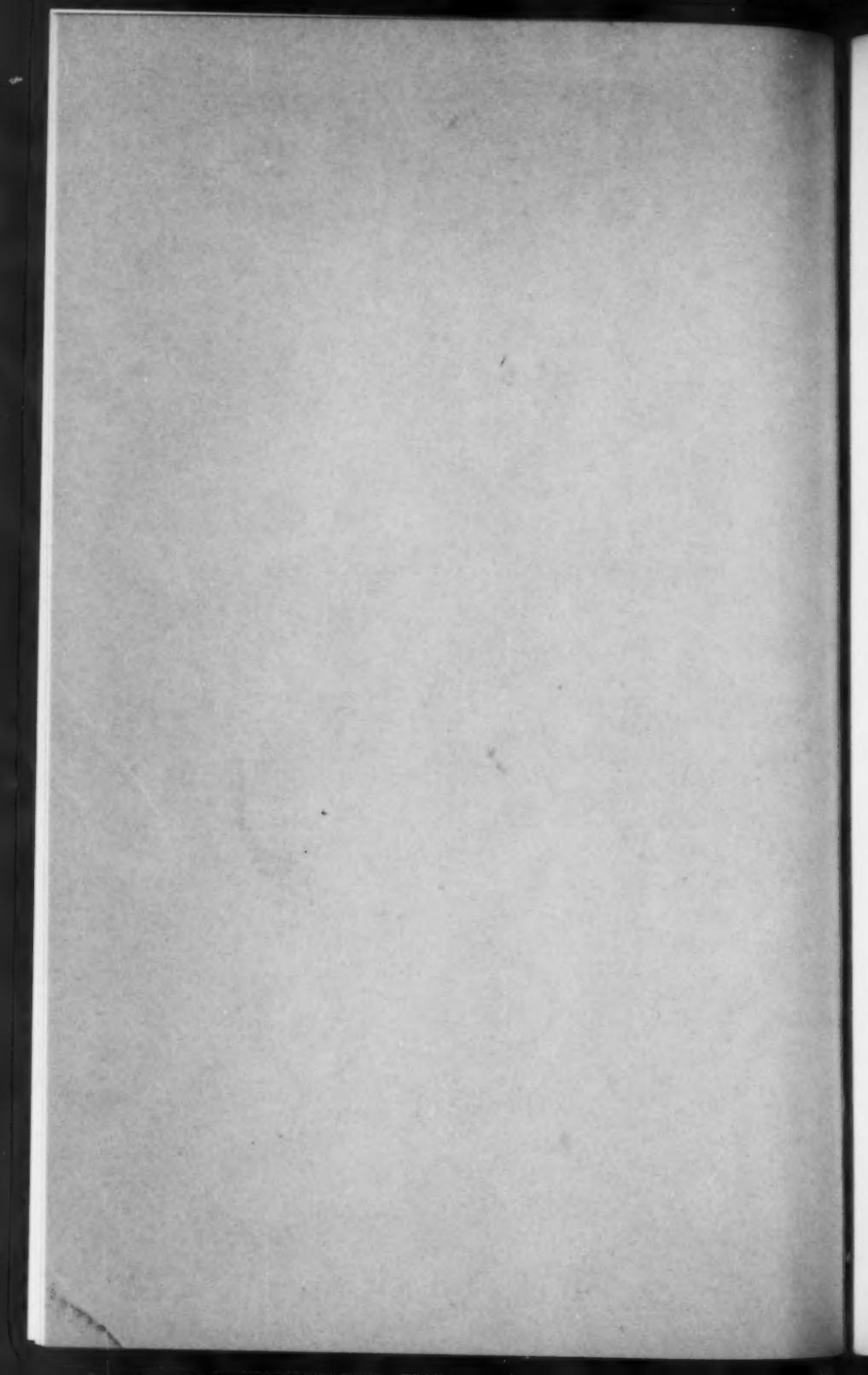
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TRANSPORTATION



THE RAILWAY AND LOCOMOTIVE HISTORICAL SOCIETY

OCTOBER, 1957



BULLETIN No. 97

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In making up this last publication for 1957 your editor feels that he has included a number of interesting articles. We welcome two new contributors to our columns. Mr. Charles S. Small has presented a very interesting and graphic account of the New York & Brooklyn Bridge R. R. True, this was not an interstate carrier, it handled no freight but it did carry a "whale of a lot" of passengers. The Brooklyn Bridge was one of the wonders of its day and it served as a means of moving the population that lived on Long Island to and from New York City. Our other newcomer is Mr. George Zabriskie who has made a contribution on a novel type of freight car. While doing some research on another subject, this material appeared. The reasons why this type of equipment was not built seem to be quite evident but every inventor lives in hope that his invention will be adopted.

We welcome back to our columns Mr. Fred Jukes who has made a valuable contribution on the engines built by the Canadian Pacific under the direction of Mr. Francis R. F. Brown. Fred Westing has furnished

us with a valuable contribution on the engines designed by Mr. Edward O. Elliott of the Philadelphia & Reading. Your Editor will heartily agree in everything stated about those Atlantic type locomotives because he was able to witness their performance many and many a time just prior to World War I. And lastly, Gilbert Kneiss has favored us with a sketch on Phineas Banning and his Los Angeles & San Pedro R. R. The late Randall V. Mills had a brief account of this road in our Bulletin No. 55 but our Vice President has gone into further detail. We hope our California members will especially enjoy it and we are still open to articles and/or papers from that section. To our member Manville B. Wakefield we are indebted for this interesting sketch of B & O No. 7618 with a load of coal cars in the Cumberland Mountains. One of twenty locomotives delivered by Baldwin in 1944 and followed by ten more the year following, the majority of these locomotives are still on the B & R roster. Long may they work! We hope that all will find something of interest in this publication.

My attention has been called to the Indiana History Bulletin, March, 1957, Vol. 34, No. 3. On page 36 and the following three pages, our member, E. G. Sulzer, has listed the lines of railroads abandoned in that state giving the mileage, place and year. Copies may be had for the asking as long as the supply lasts—it would be nice if you enclosed return postage and I'm sure that this compilation will be of interest to many of you. Also, the University of Kentucky Libraries, Lexington, Ky., has recently published a similar listing of the abandoned railroads in that state, copy of which may be had upon request.

The Railway of the New York and Brooklyn Bridge

BY CHARLES S. SMALL

THE BEGINNING—1883

The opening of the New York and Brooklyn Bridge on May 24, 1883, shown in Figure 1, was an important event in minds of the citizens of the twin cities of New York and Brooklyn. The building of the bridge had captured the interest of the people as, without doubt, it was the major engineering feat of the era. In addition to their interest in the bridge as a spectacle, and the feeling of civic pride, there was also the desire for better and faster transportation.

Prior to the opening of the bridge, the only connection between New York and Brooklyn was by ferry. The magnitude of the traffic was considerable as some 112,000 people per day crossed on the Union Ferry boats which ran on routes parallel to the new bridge. Robert Fulton, after a century and a half of service by boats propelled by men or horses, had designed the first steam ferryboat. This craft, the *Nassau*, began operations in May 1814. Fulton's name was given to the ferry route and, in turn, to the two streets in New York and Brooklyn that it connected.

Rapid transit, by means of elevated railroads, was firmly established in New York and, by 1880, the 9th, 6th, 3rd, and 2nd Avenue elevated lines were all in full operation. It was, therefore, natural during the planning of the bridge that rapid transit facilities were considered. The principal question upon which there was considerable time spent was the method of propulsion to be used.

W. A. Roebling, the son of J. A. Roebling, who took over his father's duties as Engineer-in-Chief upon his father's death in 1869, in a report to the Bridge Trustees on March 4, 1876, decided against steam propulsion. His theory was that the steam engines would impose unacceptable concentrated loads on the bridge structure. It is interesting now to reflect and realize that the Roeblings designed and built a better bridge than they, or anyone else at the time, could have possibly imagined.

Roebling's recommendation was for cable traction as this means of propulsion had been used with great success on many inclined plane railroads in Pennsylvania, for which his father had supplied the wire rope cables, and had been in operation for several years in San Francisco.

In addition to the ability of the cable to haul the cars up the 3 3/4% grade on the approach, it had the virtue of controlling the speed down-grade on the opposite approach. Further, it spaced the trains and maintained the interval between them.

There was much discussion as to which of the two methods of cable working was to be adopted. The two methods proposed were called the

Alternating and Circulating systems. In the alternating system, as typified by the inclined plane railroads, the cable traveled in one direction to carry a car from one terminal to the other. When the car reached the far terminal the cable would be reversed for the return journey. With this arrangement, the two tracks would be worked independently each carrying two-way traffic. The circulating system envisioned a cable which travelled always in the same direction operating each track in opposite directions since it was reversed by means of pulleys at the far end.

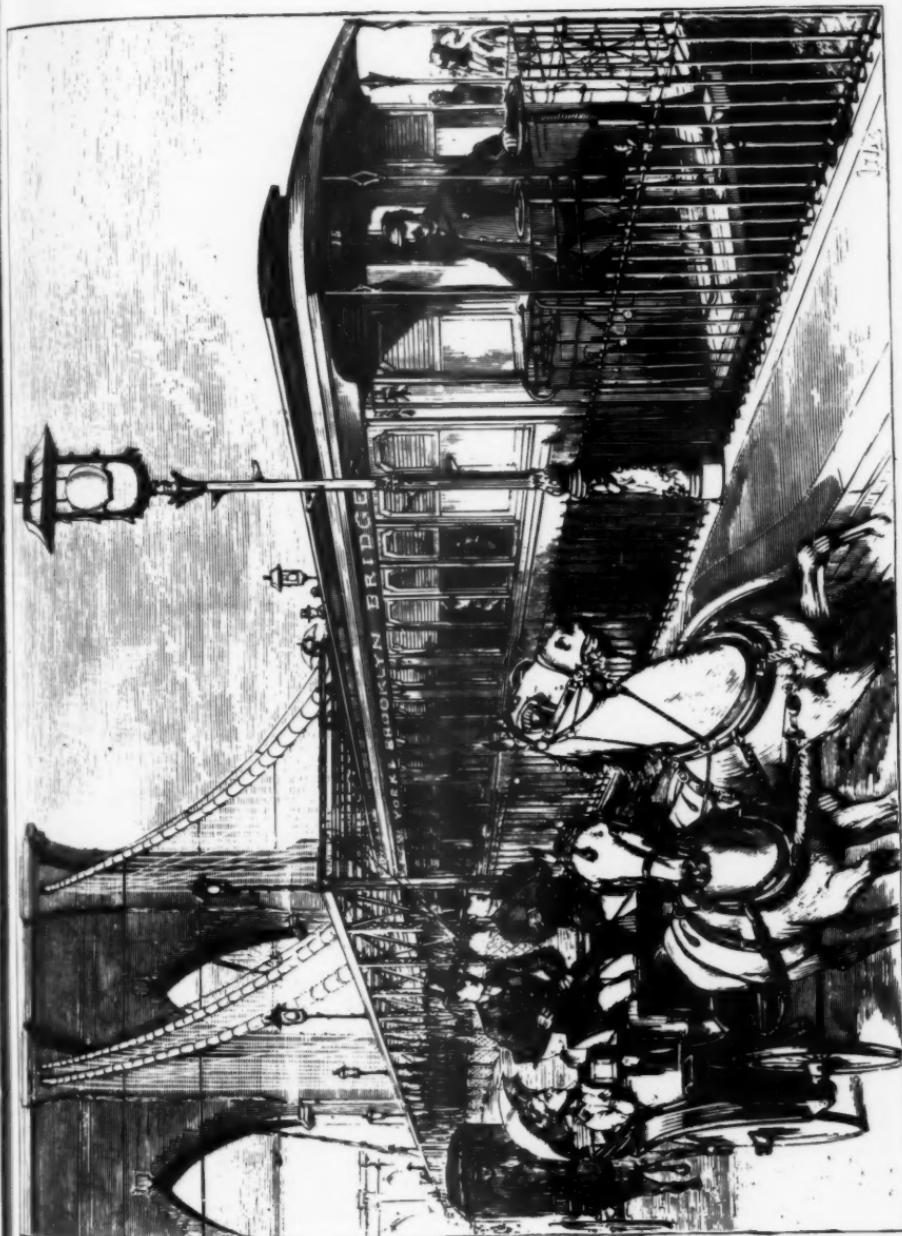
It is obvious today that the alternating system could never have met the traffic demand. While it might not have been so obvious then, at least the engineers saw its disadvantages and settled on the circulating system.

One thing is apparent and that is that the engineers of the bridge never foresaw the magnitude of the rapid transit traffic that would develop. They evidently designed for the existing traffic, with perhaps a generous safety factor, forgetting that a new and easier route attracts traffic that never existed before. It must also be remembered that the Brooklyn elevated railroads were only in the construction stage during the last years of the bridge planning and their effect on the traffic could not be accurately estimated. The first line opened in 1885 and the balance of the lines in 1888 some five years after the completion of the bridge. One interesting point in connection with the elevated lines is that two of the three construction companies built their terminals at Fulton Ferry seemingly ignoring the bridge and its railway.

Some three months after the bridge had opened, on August 8, 1883, the first one-car train was hauled across the bridge by the cable machinery. Six weeks later, on September 24th, the first passengers were carried. Thus began a service, pictured in Figure 2, that continued for six decades and for two of these decades was the only rapid transit service between the two cities.

The first rolling stock consisted of 24 passenger cars, 36' 4" long, fitted with cable grips and hand brakes and two small 0-4-0 saddle tank engines. One engine was used at each station to switch the single car from one track to the other and to provide service in the event of the failure of the cable machinery. Engine No. 1 was built by H. K. Porter & Co. and was used during the construction of the line. No data on Engine No. 2 has been located.

The cable machinery that supplied the motive power was located in a vault partially under the Brooklyn approach on the river side of Prospect Street. The boiler house was adjacent to the vault and, together with the shops of the bridge, occupied the southeast corner of Prospect and Washington Streets. A horizontal steam engine drove the cable at ten miles per hour. An excellent description of the cable machinery, written by Mr. G. Leverich, can be found in the "Transactions of The American Society of Civil Engineers," Volume XVIII, No. 380 dated March 1888.



THE CARS AS THEY WILL BE ON THE BROOKLYN BRIDGE—DRAWS BY HARRY ODRÉS.

Figure 2. The New York approach with the single car train is shown in this illustration. In the distance underneath the Franklin Square is the 2nd and 3rd Avenue Elevated. The cables are not shown because the drawing was made before service actually commenced.



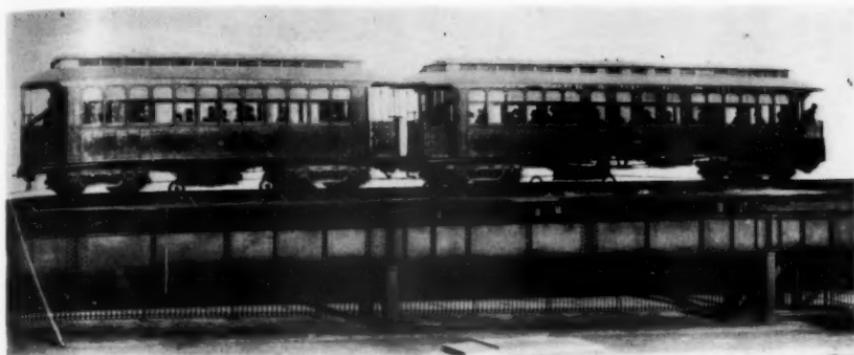


Figure 3A. A two-car train bound for New York at the point, near Prospect Street, where the cable was lifted into the grips on the cars. (Photo courtesy of the Department of Public Works, Division of Bridges, City of New York.)



Figure 4. The New York station showing the lengthened tail tracks extending across Chatham Street (Park Row) and the City Hall station of the 3rd Avenue Elevated. (Photo courtesy of N. Y. Historical Society—Norwin H. Green Collection).

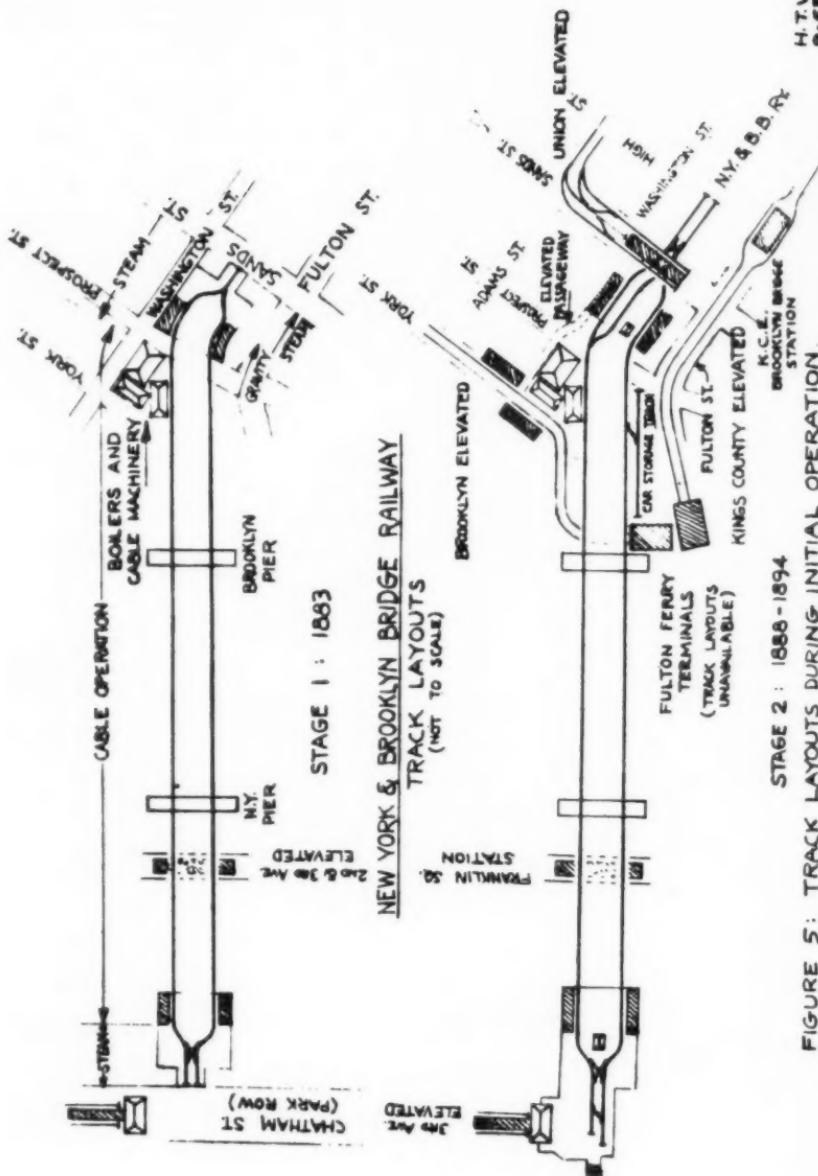


FIGURE 5: TRACK LAYOUTS DURING INITIAL OPERATION

Figure 5. Track layouts 1883-1888.

Figure 5. Track Layouts 1895-1897.

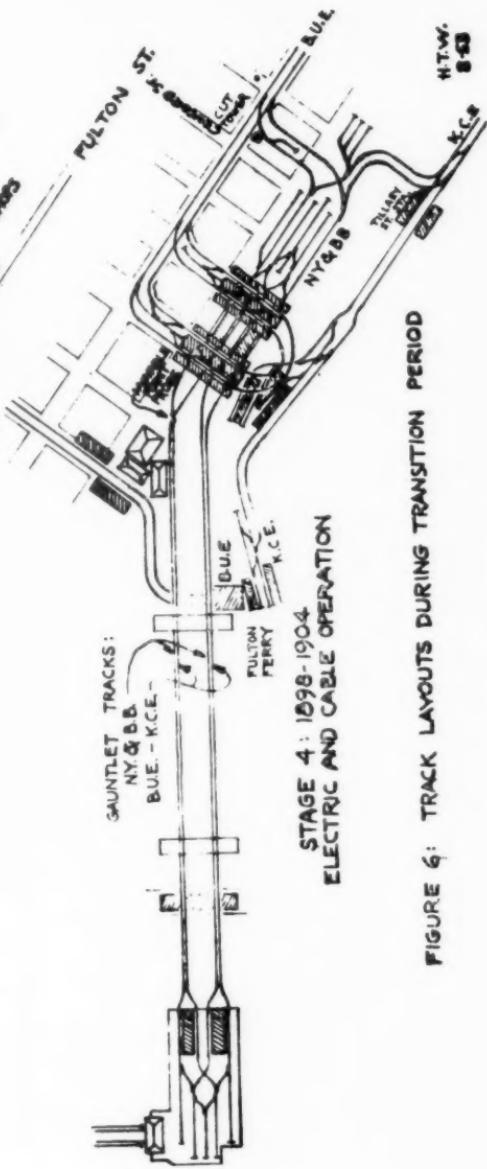
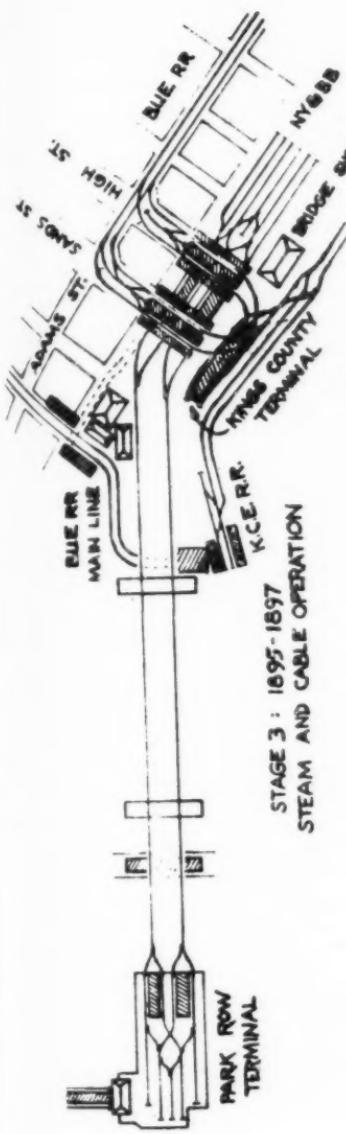


FIGURE 6: TRACK LAYOUTS DURING TRANSITION PERIOD

Figure 6. Track Layouts 1895-1897.

The original track layout, see Figure 5, was quite simple. At each station there was an arrival and departure platform. At New York there were two tail tracks and a double crossover while at Brooklyn there was only a single tail track.

Operation was a bit complicated because the cable could not be used for switching cars at New York and because it did not extend in to the Brooklyn station. A car coming into the station at Brooklyn let go of the cable at Prospect Street and coasted into the station under control of the hand brakes. Here the locomotive coupled on, took the car to the tail track after the passengers had disembarked, and then pushed it into the other platform track. When the New York bound passengers were aboard, the engine shoved the car out on to the approach until it had picked up the cable. At the New York end, the cable ran through the inbound station platform and over some large pulleys which reversed its direction and then out through the Brooklyn bound track. The steam engine here merely had to shift the car from one track to the other. An attempt was made to use a reversible cable, which had a small barney car attached for each stub track, but the system evidently was not satisfactory and, although rebuilt, the switching continued to be done by steam engines.

The fare for the bridge transit was 5c which was not an inconsiderable sum in 1883. Yet, in the first six months operations, the staggering total of 3,027,240 passengers were carried, averaging 19,916 per day, the bulk of the traffic being carried during the morning and afternoon rush hours. The traffic soon outdistanced the capacity of a single car and within a month of the opening two-car trains were in operation.

Figure 3 shows a single car train on one of the approaches performing the conventional task of the day of frightening horses in addition to carrying passengers. It is evident that the conductor's job was no sinecure. He stood on the front platform and operated the grip by means of the large hand wheel, in the center of the car, and the brake with the smaller wheel. His was not an enviable job when the winter winds came down the East River.

THE INTERMEDIATE PERIOD 1884-1894

Whenever there are passengers and a rapid transit line there are difficulties. The patrons of the New York and Brooklyn Bridge were most unhappy. Traffic was booming. From February 1884 through January 1885, the line had carried 9,234,690 complaining people. The next year, due in part to the operation of the first line of the Brooklyn Union Elevated, the traffic had more than doubled as 19,964,000 crossed in the cable cars. In March 1885, the fare was reduced to 3c per single trip or 10 trips for 25c and, on September 15th of that year, three-car trains were introduced to handle the crowds.

There was no doubt that the rush hour jam was terrible and something had to be done. Some remedial measures to speed up traffic

were taken, one of which was to add additional tracks at the Brooklyn terminal, so that all the traffic was not tied up while the steam engine, that pushed the cars out to the point where the cable was picked up, ran back through the platform track to start the next operation.

Engines No. 1 and No. 2 were evidently too light or worn out from service during the construction and early in 1884 two new 0-4-0 ST's were purchased from Baldwin. As trains grew longer these locomotives were overtaxed and during 1886 and 1887 six more 0-4-0 ST's, weighing about 22 tons each, were purchased from Dickson. These locomotives could handle four cars on the level at the terminals and two cars across the bridge. During the hours of early morning from 1:00 A. M. until 5:00 A. M., the cable engines were stopped and the bridge service was operated by steam locomotives.

In 1888, by which time the line was hauling 30,940,605 complaining passengers per year, 44 new cars were bought from the Pullman Palace Car Company. These cars, 48' 10" long, foreshadowed future rapid transit developments by being equipped with center doors to speed up discharge and loading. With the arrival of the six new saddle tank 0-4-0 ST's, engines No. 3 and 4 were sold to the Thomasville, Tallahassee & Gulf Railroad.

The tracks at both stations were lengthened to handle four-car trains which began operating September 9, 1888. Figure 4 shows the New York station with the lengthened switching tracks and the City Hall 3rd Avenue Elevated station on the left. The fundamental operating difficulties still remained. The terminal arrangement with one arrival and one departure track, and the time consumed switching, limited the number of trains that could be operated.

Eminent engineers studied the problem and various civic groups published their views on the subject but still the crush continued, each year becoming a bit worse. The first extensions to the original structures were authorized by Chapter 4 of State Laws passed on February 2, 1886. This work was not actually started until February 18, 1888 at Brooklyn and some time in 1889 at New York. To speed up operations power brakes were fitted to the cars. They were the vacuum type popular at the time. At first the vacuum reservoirs were charged by the steam locomotives at the terminals but later a reciprocating vacuum pump was installed on each car to keep the reservoir evacuated.

Figure 3A shows a two-car train, bound for New York, at the point near Prospect Street where the cable was picked up by the cable grips. The photographer, when he blocked out the background, was a bit too zealous and removed the spokes on the idler pulleys that raised the cable. These pulleys were on hinged arms raised by a lever. The first car is one of the original short cars. The second car, from its number, is also one of the original 24. It is not known whether this car was rebuilt and lengthened or whether there were two types in the original complement.

A Board of Experts, all noted engineers, tackled the problem and in January 1891 reported on their findings. They recommended com-

plete rebuilding of the two terminals with two sets of arrival and departure tracks and the installation of gauntlet tracks across the bridge. The logic behind the gauntlet arrangement was to permit the use of two separate cables which would be continuous right through the station platforms at New York. The time for switching would be considerably reduced and station time cut so that the headway between trains could be shortened. The additional power for more trains would be furnished by a second set of cable engines.

Prior to this report, one of the bridge engineers, Mr. G. Leverich, issued two reports. This first report in 1888, published in the American Society of Civil Engineers Transactions, describes the cable machinery, the details of operation and suggests new terminal facilities for which a design was proposed. In the second report he showed, by mathematical computations, that the only solution for the operating problem lay in better terminals at New York and Brooklyn.

Early in 1892 the Trustees asked for a further report from their engineers on the design of the new terminals and other improvements and this report was issued in September of that year. The year 1892 marked the completion of additional storage yard facilities built on an elevated structure extending from Concord to Tillary Streets.

The contracts were let for the new terminals in 1893, the Brooklyn contract on February 18th and the one for New York on June 7th.

This year saw the acquisition of Steam Engine No. 11. In September the Trustees asked their engineers to investigate electric traction. The results of the study convinced the Trustees that steam switching and steam locomotives for off peak operation, with the cable handling the heavy traffic, was to be retained. With the plaintive air of people who hate to be pioneers they concluded that when electric traction had proved itself on $3\frac{3}{4}\%$ grades elsewhere they might consider a change. They bought a 2-4-2 T from Baldwin that weighed $34\frac{1}{2}$ tons and noted with satisfaction in their Year-end Report that it would haul a three-car train over the bridge and that wear and tear on the switches was minimized due to the pony truck wheels. This locomotive saw only four years service. The final steam locomotive, No. 12, similar to No. 11, was purchased in 1895 and this engine is pictured in Figure 4B.

A duplicate set of cable machinery was erected in 1893 to permit the gauntlet scheme to be carried out. The boiler house was also enlarged to care for the increased steam requirements.

The bridge from its opening day had been illuminated by electricity and, in 1894, it was decided to install electric lights in the bridge trains. A 500 volt DC trolley wire was strung over the tracks and the cars fitted with trolley poles.

THE FINAL PERIOD 1895-1898

The reconstruction at the Brooklyn end was the simpler of the two terminal jobs. The new station was built on the opposite side of Sands Street, just across the street from the old station, and occupied the block between Sands and High Streets along Washington Street.

When the Union Elevated constructed their terminal for the Myrtle Avenue line, it was located in Sands Street at right angles to the bridge station and on a high structure that was above the bridge tracks. This stub terminal of one of the lines comprising the Brooklyn Union Elevated Railroad was incorporated in the new bridge terminal. The Kings County Elevated Railway, later called the Fulton Street Elevated, was to have an identical terminal at the same level at the other end of the bridge station. They elected not to use the facility so the two upper level stations were joined by a loop and used by the Brooklyn Union. The Kings County built a station, under contract with the Bridge Trustees dated November 8, 1894, parallel with the bridge terminal just inside the curb line of Fulton Street and connected to it with an elevated passageway. Figure 6 shows the track layout. All of the construction at Brooklyn was completed and placed in service in July 1895.

Figure 7 shows an artist's impression of the interior of the new Brooklyn station.

At the New York end the problem was more complicated since the new station was built on the site of the old terminal. To make the problem more difficult, the new plans called for the elevation of the terminal tracks to be raised six feet. Figure No. 8 shows this station with No. 12 outside the train shed. Figure No. 6 gives the track layout. Due to the difficulties of construction, the New York station was not completed and placed in service until 1896.

The new Brooklyn terminal of the bridge railway was linked by convenient passageways to all the Brooklyn elevated railroads and, accordingly, the elevated lines reduced their services to Fulton Ferry.

Early in 1896, the bridge Trustees decided to review electric traction and asked the General Electric Company to undertake a test. On February 8, 1896, a test motor car operated across the bridge utilizing for its energy supply the overhead trolley wire installed two years before for car lighting. The test was a success but still the Bridge Trustees were skeptical. They felt that electricity could only be used for switching and that operation across the bridge would continue under cable propulsion.

In October of 1896, 20 motor cars were ordered from the Pullman Palace Car Company and each car was equipped with four 50 H.P. motors. These cars are referred to as locomotives in some contemporary literature. Outside third rail was selected as the means of power distribution.

These cars went into service on November 30, 1896. A train consisted of one motor car, at the Brooklyn end of the train, and three of the 1888 Pullman cars, equipped with cable grips, as trailers. The electric motor car acted as a locomotive when switching at each end. Only if the cable grips slipped was the electric power used on the bridge proper. Electrified switching was a complete success and on January 23, 1897, the steam engines were taken out of service and sold.

LOCOMOTIVES OF THE NEW YORK & BROOKLYN BRIDGE

No.	Builder	C/N	Date	Type	Cyls.	DD	Note
1	Porter	558	1883?	0-4-0 ST	9 x 14	36	
2							
3	Baldwin	7137	1-84	0-4-0 ST	9 x 14	36	(1)
4	Baldwin	7296	5-84	0-4-0 ST	9 x 14	36	(1)
5	Dickson	525	1-86	0-4-0 ST	11 x 16	38	
6	Dickson	526	1-86	0-4-0 ST	11 x 16	38	
7	Dickson	545	7-86	0-4-0 ST	11 x 16	38	
8	Dickson	601	8-87	0-4-0 ST	12 x 16	38	
9	Dickson	619	11-87	0-4-0 ST	12 x 16	38	
10	Dickson	620	11-87	0-4-0 ST	12 x 16	38	
11	Baldwin	13827	10-93	2-4-2 ST	14 x 16	42	(2)
12	Porter	1579	-95	2-4-2 ST	—	—	

(1) Sold to the Thomasville, Tallahassee & Gulf Railroad.

(2) Sold to the Rockaway Valley Railroad—1897.

On February 15, 1897, the gauntlet tracks and the second set of cable machinery were placed in operation thus completing the rebuilding planned in 1892. See Figure 6. The electric motor cars speeded up the switching operation and the two cables allowed the number of trains to be increased. In keeping with bridge tradition, the controller on the electric cars was placed on the front platform in the same place as the grip wheel on the trailer cars so that the operator could get the river breezes summer or winter.

The year 1897 was to see the execution of four contracts which were soon to bring the separate existence of the N. Y. & B. B. railway to an end. On August 23rd contracts were signed with the Brooklyn Heights Railroad for trolley service over the bridge with the Associated Trolley Companies comprising the Brooklyn Heights Railroad Company, The Brooklyn Queens County & Suburban Railroad Company, The Nassau Electric Railroad Company, The Brooklyn City & Newton Railroad Company, and The Coney Island & Brooklyn Railroad Company. The other two contracts were with the Brooklyn Elevated Railroad Company and the Kings County Elevated Railroad Company. The provisions of these last two contracts are interesting both from the standpoint of how operations were to be conducted and in the light of subsequent events. The two contracts were substantially identical and can be summarized as follows:

1. The connection of the elevated lines to the tracks of the N. Y. & B. B. Railway to be at or north of Tillary Street.
2. (a) The Brooklyn Elevated to use a platform at the New York Terminal which was to be constructed between the tail tracks.
(b) The Kings County Elevated to use the present or any subsequently constructed outbound platform at New York.
3. Each car, except motor cars, to be used on the bridge must have grips, together with some appliance for braking similar to the equipment on the bridge cars. One car in each train must have electric motors identical with those adopted by the bridge Trustees for switching trains at the termini. All cars must have side doors.

4. Steam engines must be detached close to the point where the train enters the premises of the Trustees of the bridge and it (the train) shall be propelled by the electric motor car to the point at which the cable is lifted into the grips.
5. The elevated trains will be operated by bridge crews.
6. Toll is to be 12½¢ per car. If, at a later date, the elevated company provides the motive power, the toll shall be 5¢ per car.
7. Elevated trains must come to a full stop where they cross the tracks of the bridge railway.
8. The Brooklyn Elevated can operate twice the number of cars as the Kings County.
9. Elevated operation will cause the surrender of one set of tracks, thus the N. Y. & B. B. Railway will only operate one-half of its present service and the elevated companies must operate the other half.

The stage was now set for through service, which was badly needed to avoid the delays occasioned at the Brooklyn station by the necessity for all through passengers to transfer and pay an additional fare. With the prospect of through service in sight, the Charter of Greater New York went into effect January 1, 1898, which incorporated the City of Brooklyn into the City of New York. Thus, as the political boundary disappeared so did the separate entity that operated the bridge. On this same date, the control passed from the Trustees to the New York City Department of Bridges.

The Department of Bridges evidently was more hard-boiled than had been the old Trustees for they set about to re-negotiate the elevated railroad contracts. They would have liked to re-do the trolley contracts but trolley service had commenced January 22, 1898, with the first car in revenue service leaving New York at 10:15 A. M. Sunday, January 23rd.

The trolley tracks had been laid, one in each roadway, on the outside of the bridge railway tracks. At the New York end, now called the Park Row station, the trolley terminal consisted of a series of loop tracks underneath the elevated station.

The Brooklyn Elevated, under the original contract, had started work on their connection near Concord Street on March 7th, and on June 3rd had made a trial trip. The first through train left New York at 11:30 A. M., June 18th, destined for Manhattan Beach and regular service started immediately thereafter. This through service was operated in conjunction with the Long Island Railroad and the Prospect Park & Coney Island Railroad. As far as 36th & 5th, where engines were changed, the train was operated on the Brooklyn Elevated trackage. From 36th & 5th to Parkville via Kensington Junction, the P. P. & C. I. trackage was used. The train continued via New York & Manhattan Beach Junction on the ex New York & Manhattan Beach, which the Long Island had widened to standard gauge in 1884.

The modified agreement, dated June 23, 1898, with the Brooklyn Elevated stipulated that:

1. Since trolley operation had decreased the local (trans-bridge only) traffic on the bridge railway, the bridge railway would be operated by the Brooklyn Elevated which need not run local bridge trains when the traffic was light.
2. The Brooklyn Elevated was to furnish all of the employees necessary for the operation of their own and the bridge railway trains.
3. Elevated trains must use the cable during rush hours but the use of the cable could be discontinued when traffic was light.
4. The Commissioner shall designate switchmen to operate the tower and other switches of the bridge railroad, and switchmen at the point where the elevated line enters Bridge Yard.
5. The toll shall be 10c per car per round trip.

There evidently were some further modifications to the original contract agreed upon on July 8th since the elevated companies were obliged to furnish their own equipment and a minimum charge of \$250 per day was set. For cars in excess of 2500, the toll was 10c per car per round trip.

That the City of New York profited by these contract changes is obvious when it is realized that the payroll of the bridge railway was \$400,000 per year. This payroll was now to be borne by the elevated companies in addition to the \$250 per day minimum. At this time, the bridge railway had 392 people in its employ, of which 165 were conductors. All of these people were dismissed from the bridge railway payroll and most of them immediately rehired by the Brooklyn Elevated.

The management of the Kings County Elevated Railroad was recalcitrant and refused to re-negotiate their contract. Their trains therefore were barred from crossing the bridge although they had begun work on their connection at Tillary Street on June 25th. They solved their dilemma by making a separate contract with the Brooklyn Elevated, the Brooklyn Elevated paying the prescribed charges to the City. This compromise was evidently satisfactory for, on November 1, 1898, the K. C. E. R. R. commenced through service.

The Brooklyn Elevated assumed control of the railway of the New York and Brooklyn Bridge on June 30, 1898. The N. Y. & B. B. therefore disappeared as a separate entity after fifteen years of operation.

OPERATION BY THE ELEVATED COMPANIES—A PERIOD OF INDECISION 1898-1907

The through service inaugurated in June of 1898 survived the year with some mishaps. A structural member failed on the bridge on July 29th and on the next day there was a collision between a bridge train and an elevated train on the Brooklyn land span. By August 1st, it was decided to limit the through train service to the rush hours and only one-half of the Lexington Avenue trains used the bridge. On September 7th, with the rush hour service proving impractical, it was decided to operate through trains only between the hours of 10:00 A. M. and 4:00 P. M. The 5th Avenue and Lexington trains operated this service on weekdays. The Myrtle Avenue trains continued to run to

Fulton Ferry utilizing the northwest wye connection at Hudson and Myrtle which was just south of the Navy Street station. Service to Fulton Ferry continued until the line was abandoned on August 31, 1904.

The difficulties of through service can be imagined when it is realized that each through train had to stop, the 5th and Lexington Avenue elevated trains at Bridge Street or at Cut Tower, and the Fulton Street elevated trains at Tillary Street, and uncouple the steam engine. Then after the locomotive was out of the way a special motor car was coupled on and the train hauled electrically through the Brooklyn Station at Sands Street where it picked up the cable. It must also be realized that only cars equipped with cable grips could be used for through service. On the return trip the opposite set of switching moves were made. The track layouts on the Brooklyn Elevated and at Tillary Street Junction on the K. C. E. R. R. were not very well designed for these operations. Nevertheless service continued.

From midnight until 5:00 A. M. three bridge motor cars operated the entire service, operating singly on a six minute headway. From 5:00 A. M. to 6:00 A. M., the service was increased to five two-car trains, each train consisting of a bridge motor car and a trailer. Starting at 6:00 A. M., the rush hour service began with fourteen four-car trains in service operating on a 72-second headway and being hauled across the bridge by the cable machinery. At 10:05 A. M. the elevated trains began operating and until 3:52 provided a $1\frac{3}{4}$ minute headway service. The rush hour service was started using the bridge equipment at 3:52 P. M. and it terminated at 8:45 P. M. At this time the cable machinery was shut down and the service, until midnight, operated electrically by bridge motor cars.

On May 1st the Brooklyn Rapid Transit Company gained control of the Kings County Elevated and the following year it was merged with the Brooklyn Union. This year marked the second track connection between the elevated lines and the Long Island Railroad. The first connection had been made the previous year for service between Broadway Ferry and Jamaica with summer service to Rockaway Park and joined the L. I. R. R. at Autumn Avenue. The second connection, opened for service May 24, 1899, connected the 5th Avenue elevated with the Long Island at Flatbush and Atlantic and on the opening day the first Long Island train operated around the upper level loop at Sands Street station.

Operating difficulties evidently increased for, on July 16, 1899, all through elevated service was discontinued except for special summer service to Manhattan and Brighton Beach. The service across the bridge was maintained from midnight to 6 A. M. by electric operation of the bridge motor cars. The rush hour service from 6:00 A. M. to 10:00 A. M. was handled by cable and electric working was then resumed until the evening rush began at 4:00 P. M. The evening rush hour was handled by the cables until it terminated at 7:00 P. M. after which electric operation was resumed. It will be remembered that during the cable operation, cars were switched at the terminals by the electric motor cars attached to each train.



Figure 1. This engraving, published in *Harper's Weekly* in 1883, shows the bridge viewed from the Brooklyn side. In the foreground is the Union Ferry terminal at the foot of Fulton Street. The pier at the lower left hand corner of the illustration was to become the site of the Kings County Elevated Railroad station at Fulton Ferry. The Brooklyn Union Elevated's terminal was parallel to the Union Ferry terminal and at right angles to the K.C.E.R.R.

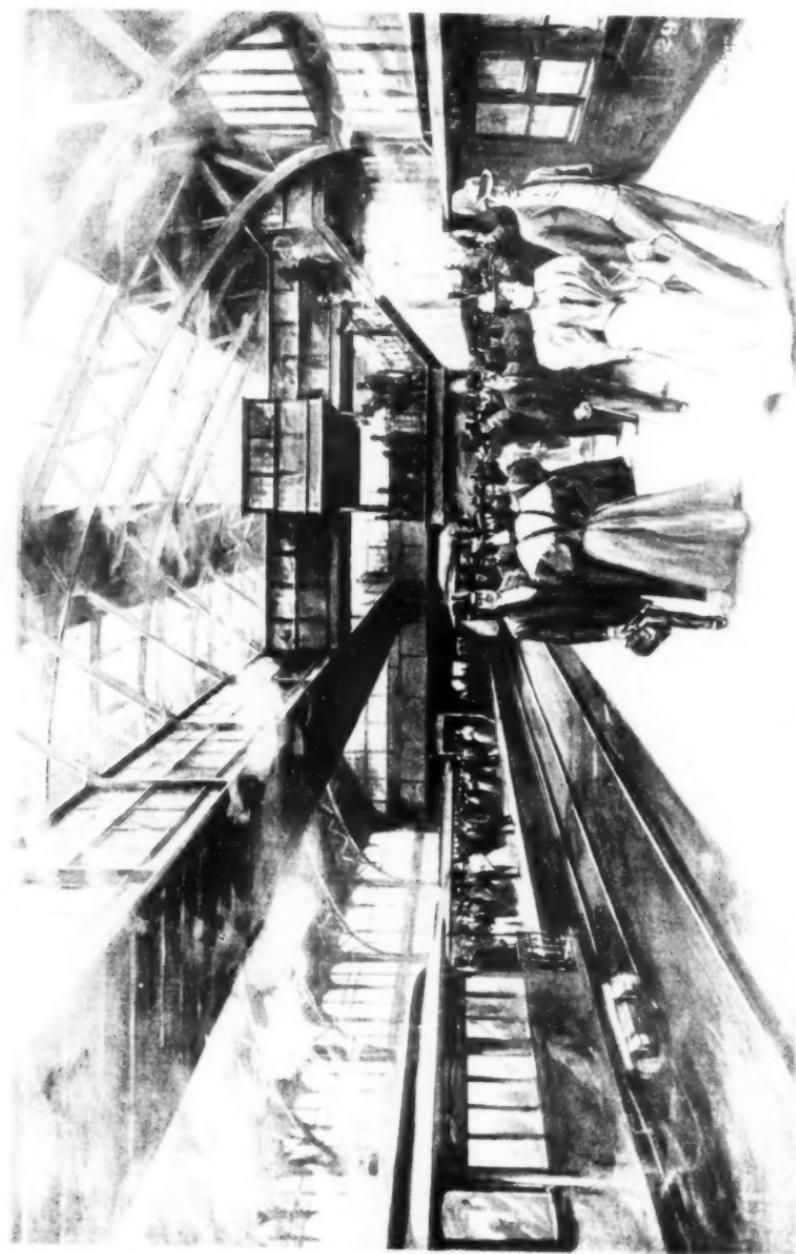


Figure 7 An artist's impression of the interior of the lower level of the New York and Brooklyn Terminal at Brooklyn in 1895.

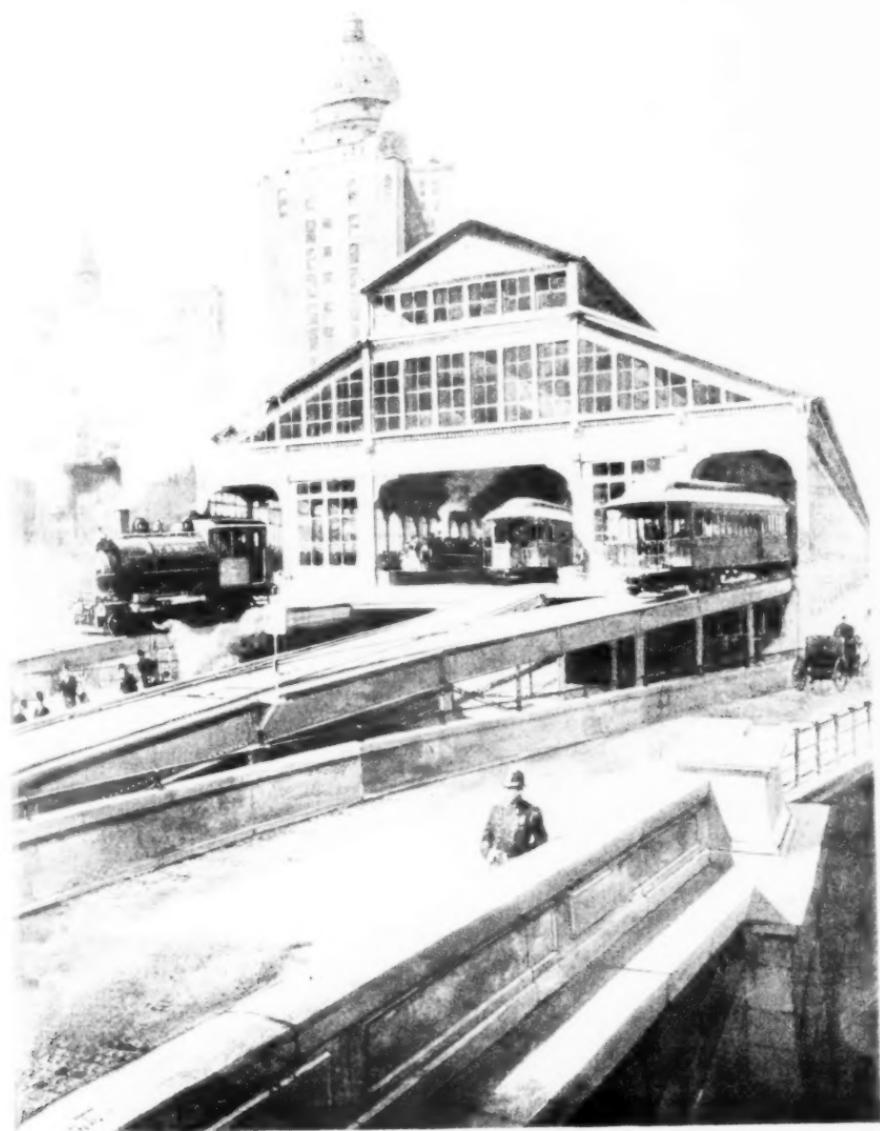


Figure 8. The New York terminal showing 2-4-2 ST #11 outside the train shed. This drawing was made in 1896.

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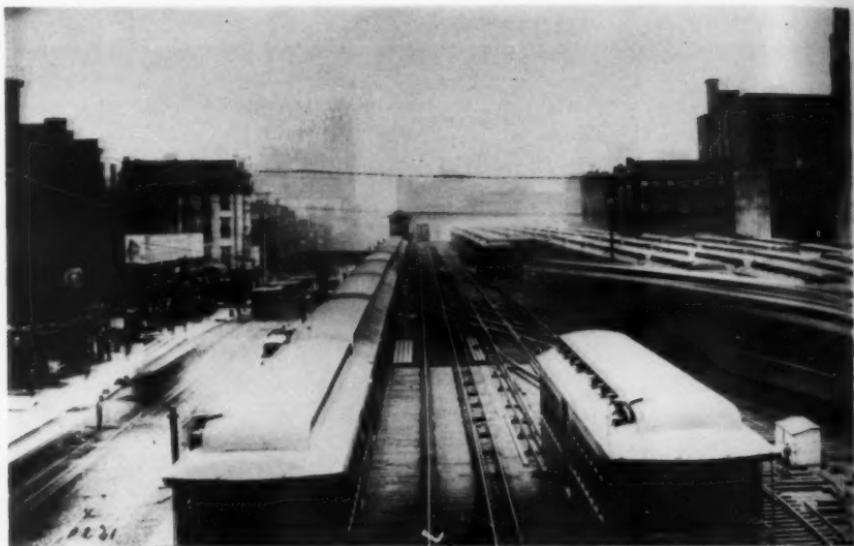


Figure 8A. The yard at Sandus Street showing the elevated connections. This photo was taken in 1907 just prior to the last major rebuilding. (Photo courtesy of the Department of Public Works, Division of Bridges, City of New York.)

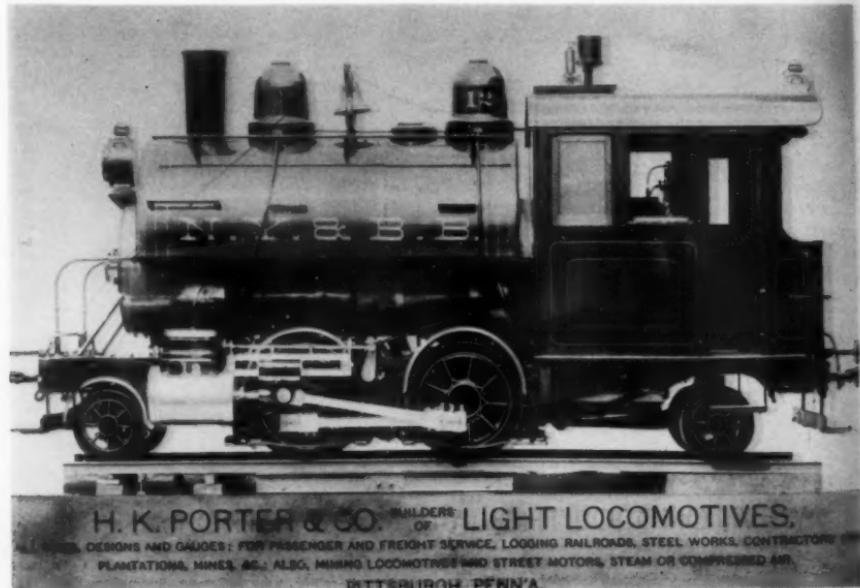


Figure 4A. Locomotive #12 built by H. K. Porter in 1895. (Photo courtesy of the Department of Public Works, Division of Bridges, City of New York.)

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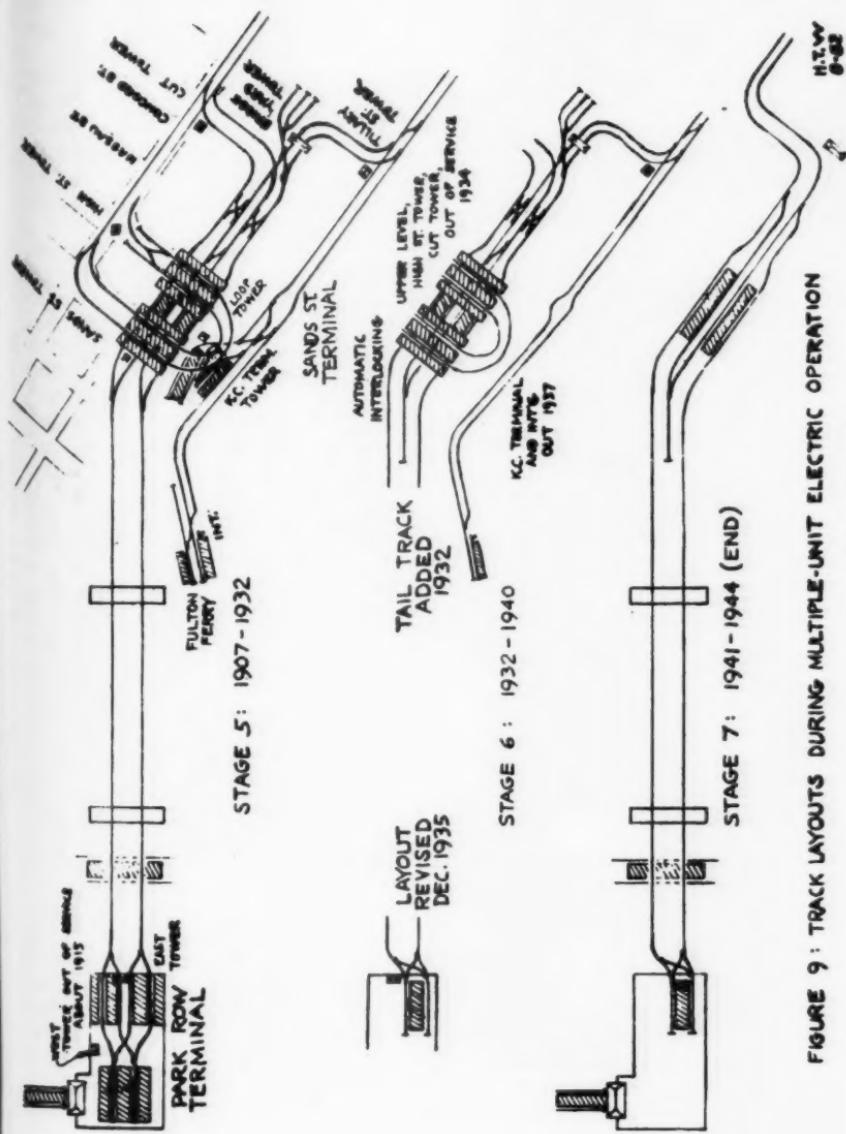
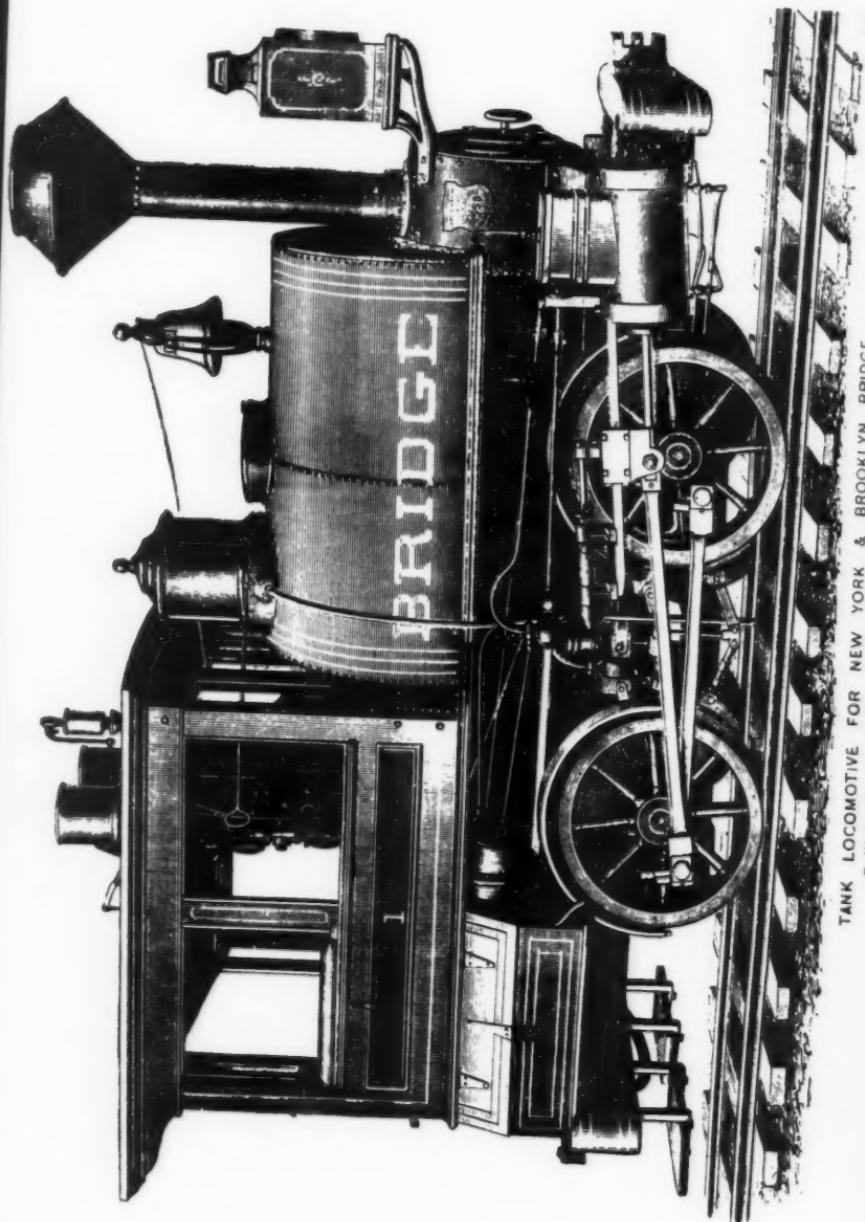


FIGURE 9: TRACK LAYOUTS DURING MULTIPLE-UNIT ELECTRIC OPERATION

Figure 9. Track Layouts 1906-1944



TANK LOCOMOTIVE FOR NEW YORK & BROOKLYN BRIDGE

Built by H. K. Porter & Co., Pittsburgh, C/N 556, 1882 or 3.

New York & Brooklyn Bridge #2. Cyls. 9x14". Drivers 36".

From Dec. 31, 1885 issue "Railway Gazette," photostat by N. Y. Public Library.

Through service was not resumed until January 21, 1901, and on June 15th a fire in a B. R. T. powerhouse forced the resumption of local working of the bridge railway. Traffic had now increased to the point where eighteen four-car trains were cable operated during the rush hours on a fifty-five second headway.

When through service was resumed on October 1st, only the Bath Beach, Brighton Beach, and 5th Avenue trains crossed the bridge for, by this time, these routes were electrically operated which obviated the necessity for a motive power change. For some reason through trains were operated from 5:30 A. M. until 4:00 P. M. and from 7:00 P. M. until 1:00 A. M. leaving the evening rush hour to be operated with bridge equipment.

The feelings of the passengers through all these changes in service can well be imagined. The crowding and the jam-packed cars which have always been, and seem always to be a part of the New York rapid transit scene, were not lessened by the problem of the through passenger and his short-haul colleague who only wanted to ride over the bridge. With the inauguration of through service, the 5c elevated fare included passage across the bridge. However, the bridge transit alone remained at 3c or two tickets for 5c. To solve this problem, a ticket was printed that was punched in the middle and that sold for 5c. A passenger boarding a bridge train tore the ticket in half. One half he deposited in the ticket box at Park Row. When he arrived in Brooklyn he had the option of terminating his journey and keeping the other half for the return trip or he could deposit the remaining half in a ticket box on the Sands Street station platform and board an elevated train. This system would not work for through cars since it would involve all of the passengers disembarking or a collector going through the train. To avoid either of these alternatives, the through trains were segregated. The first car was for local passengers and the remaining three cars for through passengers. All passengers put half of their ticket in a collection box before entering the platform. Only those going across the bridge entered the first car. Those going further on put the other half of their ticket in a box on the Park Row platform and boarded the rear cars. At Sands Street the front end of the platform was barricaded so that the first car stopped on one side of the barrier and the last cars on the other side. The front of the platform had a stairway directly to the street while from the rear of the platform the stairs led up to the passageway communicating with the other lines.

There is nothing to be gained by following the vicissitudes of through service in the years of 1902, 3, 4 and 5. Suffice to say that as the elevated lines became electrified, the operating problems became simpler even though traffic still increased. The opening of the Interborough Rapid Transit Company subway in 1904 provided additional traffic to be handled. When first opened, the southern terminal of the subway line was at Brooklyn Bridge station, which was across the street from Park Row.

The work at Park Row, to extend the platforms to handle five-car trains, was completed in February 1906 and five-car trains were first

operated on June 28th of that year. A year later, the platforms were extended again to handle six-car trains.

Figure 8A shows the Sands Street yard looking east from the station. The elevated connections can be seen, the Myrtle/Lexington/5th Avenue line diverging to the left, and the Fulton Street line running straight into the background. The cars stored in the yard are those used for local (trans-bridge) service. This picture was taken in 1907 just prior to the last major rebuilding.

ELEVATED OPERATION—THE MIDDLE YEARS 1908-1932

On January 9, 1908, the I. R. T. opened its East River Tunnel and the twenty-five year rapid transit monopoly of the Brooklyn Bridge was broken. The trolley service across the bridge had siphoned off most of the cross bridge local traffic and the bridge railway local trains were withdrawn on January 27, 1908. On this day the cable engines ceased forever and all traffic was handled by elevated trains whose length in the rush hour had been increased to six cars. A special trolley service was started to carry local passengers at the old fare of two tickets for 5c. On 16th September 1908, the first Broadway Elevated train crossed Williamsburg Bridge and another breach was made in the bridge traffic.

The trolleys, when they entered or left the bridge, had to cross Sands Street which resulted in traffic jams in rush hours. To rectify this situation, the trolley tracks were carried over Sands Street on an elevated structure, which was parallel and on each side of the elevated railway tracks. An additional set of platforms was added to the Sands Street station for the trolleys. This work was placed in service in September 1908.

To speed up the elevated service, new interlockings were installed at Park Row and automatic signals were put in service on August 8, 1908, at which time the B. R. T. removed the gauntlet tracks. The Park Row track layout remained the same except for the platform extensions but extensive rebuilding was undertaken at the Brooklyn end. The mechanical interlocking installed at Bridge Yard in 1905 was replaced with an electro-pneumatic machine and the trackage extensively rebuilt. See Figure 9.

It had been the plan, during the discussions in the early 1900's on the alleviation of the congestion at Brooklyn Bridge, to link the Brooklyn and Williamsburg Bridges by means of a subway to be called the Center Street Loop. When the new Municipal Building had been planned in 1908, an extensive subway station had been incorporated in the basement. This station was to be connected with the two tracks over Brooklyn Bridge and the tunnels necessary for the connection were actually partially completed. When a new interlocking machine was installed, consolidating the two original electro-pneumatic machines at Park Row about 1918, spare levers were left for the necessary signals and switches. Broadway Brooklyn elevated trains operating over the Williamsburg Bridge actually reached this station, called Chambers Street, on August 4, 1913, but before the connection was made new plans were in progress and the partially completed tunnels were never used for trains.

New subway construction was pushed forward rapidly. The I. R. T. extended their original line down 7th. Avenue and a branch of this line crossed the East River through the Clark Street Tunnel on April 15, 1919.

The New York Municipal Railway Company was formed on September 27, 1912 by the Brooklyn Rapid Transit Company, to operate the subway lines being built by the City of New York in Manhattan and Brooklyn. The wholly owned lines to be operated in conjunction with City owned routes were combined November 30, 1912, as the New York Consolidated Railroad. In June 1923, the "Municipal" and the "Consolidated" were combined to form the New York Rapid Transit Corporation which functioned as an operating company under the B. R. T. and its successor, the Brooklyn, Manhattan Transit Corporation. The first line, opened in 1915, was from Chambers Street across the Manhattan Bridge to Coney Island via the reconstructed Sea Beach line. Another route, over Manhattan Bridge to 14th. Street and Union Square, opened on September 4, 1917, and by January 5, 1918, these tracks had reached Times Square. The line down Broadway, Manhattan, from Canal Street and over to Brooklyn via the Montague Street tunnel was opened on August 1, 1920.

At first, these new lines had little effect on the Brooklyn Bridge traffic since travel patterns are slow to change. The early 1920's marked the peak of the elevated traffic even though the seeds for the decline had been sown.

ELEVATED OPERATION—THE DECLINING YEARS 1932-1941

On September 10, 1932, the City of New York entered the rapid-transit scene with the inauguration of the city-operated "Independent System" subway line. On February 1, 1933, this system was extended to Jay Street, Brooklyn, with stations at Broadway-Nassau in Manhattan and High Street, Brooklyn Bridge, in Brooklyn, competing directly with the Brooklyn Bridge route. On April 8, 1936 another East River tube was opened extending from East Broadway, Manhattan to York Street, Brooklyn. By this time there were in operation five double-track tubes to Brooklyn, four tracks over the Manhattan Bridge, and two tracks over the Williamsburg Bridge, a total of 16 tracks of rapid-transit service between Manhattan and Brooklyn in addition to the two original tracks still in service over Brooklyn Bridge.

By this time, however, Brooklyn Bridge traffic had greatly declined. In December 1935, Park Row station was cut down to one-third its former size. The upper level station at Sands Street was closed and service no longer operated out of the old Kings County terminal at Fulton and Sands Streets. The closing of the Sixth Avenue elevated on December 8, 1938, foreshadowed the eventual abandonment of all of the elevated structures.

In 1940, the City of New York acquired the I. R. T. and B. M. T. rapid-transit lines and plans were made to abandon elevated operation as soon as practicable. Operation of the 5th Avenue elevated and the Fulton Street elevated was discontinued on May 31, 1940, and in 1941

the Fulton Street elevated structure was removed. What remained of the Bridge Yard layout was left in service for the Myrtle Avenue trains, and for the Lexington Avenue trains which continued to operate to Park Row. However, on March 5, 1944, operation of trains over Brooklyn Bridge ended forever. On that day, Park Row, Sands Street, and Adams Street stations were abandoned, and a terminal for Myrtle Avenue trains was established at Bridge Street. This ended almost 61 years of operation of trains over Brooklyn Bridge.

This was not the end of rail service since trolley cars were still using the vehicular roadways. To permit the removal of the cars from the roadways trolley wires were strung again over the former elevated tracks. These tracks, which had seen operation by steam, cable, and third rail, now entered their final phase when trolley cars commenced operating on December 15, 1944. In the meantime, demolition of the elevated stations went on and, by November 1944, the monumental train sheds at Park Row and Sands Street were entirely removed. At Park Row, an open-air trolley terminal of several very short loop tracks was used and operation continued until 1950. Midnight, at the end of March 5, 1950 marked the end of trolley-car operation over Brooklyn Bridge to allow rebuilding of the bridge for wider roadways. This was also the end of public-carrier service, no bus service being substituted. Thus ended almost 67 years of rail service over this historic bridge.

ACKNOWLEDGEMENTS

Citing those that helped by furnishing information, sources, and assistance is a difficult task. Although the manuscript was written in 1952/3 the project was one of long standing. It is therefore only possible to list here those who made major contributions.

Mention must be made here of the assistance rendered by the Department of Public Works of the City of New York. The Commissioner, Mr. F. H. Zurmuhlen, The Director of the Division of Bridges, Mr. J. Frank Johnson, and the Engineer of the Brooklyn Bridge, Mr. T. Mombelly, made the original plans of the Bridge available. They also found and made available photographs which were unobtainable from any other source.

Mr. H. T. Wilhelm is responsible for putting the track layouts in easily readable form and furnishing the data for the concluding chapter. Mr. W. B. Coughlin and Mr. J. T. Wilson furnished data on the Brooklyn Elevated lines, and Mr. C. E. Fisher furnished the locomotive roster. Mr. Harry Cotterell made available much data on the ferry lines, which could not be included for lack of space. Much of the background material came from Mr. D. B. Steinman's excellent book "The Builders of The Bridge." And, lastly, the author is indebted to Miss Mary R. Magliola for the preparation of the manuscript in its final form.

Some Early Brown Locomotives on the C. P. R.

BY FRED JUKES

Almost as soon as the steam locomotive had begun to take a more or less accepted pattern as to its essential parts, the men who designed and built it managed also to give their product something of their own individuality insofar as appearance went.

In its earliest days more attention was paid to making it a workable machine, but soon, at least in England, Locomotive Engineers, the equivalent of our Superintendents of Motive Power, began to see to it that their product became a thing of beauty; each according to his own standards.

This tendency reached its peak during the '70s, '80s and '90s of the last century and the engines that came from the shops or "works" of the many British lines of the day were, for beauty of line and proportion, clean surfaces unmarred by pipes and other attachments, distinctive paint jobs and fine finish, among the handsomest machines that ever travelled on rails.

Whether or not the railways of the British Isles built their motive power as well or as economically as they could have bought it is a question, for there were plenty of private builders in the country. At any rate all the large systems, and some of the smaller ones, went in for building their own, with the result that each developed an unmistakable set of external features such as stack, dome, cab, wheel splashes and color schemes, by which the merest tyro could recognize them.

Occasionally, when a motive-power head went from one line to another, the exterior appearance of his engines went with him, for these old timers had an artist's pride in their work, and each had his admiring and enthusiastic following.

Gradually this interesting phase of design began to feel the effects of two influences; one, the steady increase in the size of the locomotive, and the other, the two consolidations of British railroads, the first of which came in 1923, when most of them were grouped to form four main systems: London Midland & Scottish, London & North Eastern, Great Western, and the Southern. Then, in 1948, came the consolidation of these four into a Government-owned and-operated system known as British Railways, which has continued as such to the present day.

Now to our own country and what was taking place. For one thing we were more or less dependent on London and other European financial centers and, being poor, our railroads were, for the most part, cheaply built, which meant grades, curvature, roadbed and track that would not have been countenanced in the older countries. This in turn called for flexibility in motive-power and rolling stock, something very different to the more rigid types almost universal in Europe.

At first the U. S. and Canada imported a sizable number of locomotives from Britain, but their plate frames and rigid wheelbase were soon found to be unsuitable for use on American track.

As a rule our roads got along without more than maintenance facilities, leaving the building of their power to one or more of the many locomotive works that sprang up to fill the demand in the rapid expansion that was to continue for three decades or more.

Early in the game a definite "American" type emerged, the "Eight-Wheel" or, as it was often familiarly called, "Standard" engine. This, an outside cylinder, bar-framed machine with four coupled drivers and a leading four-wheeled truck, was to be maid-of-all-work on the roads of this continent for many years, and was still very much in the picture in passenger service up to 1900.

Where the Britisher left the design and building of his locomotives mainly in the hands of the company's Locomotive Engineer, we, on our side of the pond, turned to Baldwin, Rogers, McQueen, Blood, Mason, Brooks and a host of others. In fact, competition was so keen that the railroads simply couldn't afford to build their own power and, with a few exceptions, this state of affairs has continued right down to the ousting of the American steam locomotive by the Diesel.

Among the larger systems which undertook the building of part of their own power were the P. R. R. at Altoona, the U. P., at Omaha, the S. P., at Sacramento, the N. Y. C., at Albany, and last, but by no means least, the C. P. R., at Montreal.

Theodore N. Ely, of the Pennsylvania, probably turned out more engines than any other American S. M. P. With their capped stacks, smooth dome and sand-box covers, and rounded cab corners they were typically P. R. R. Joseph McConnell, who revamped the U. P.'s hap-hazard motive power department of the '90's, developed a style that stood out because of a number of features including his distinctive diamond stacks. A. J. Stevens, General Master Mechanic at Sacramento, left the beaten track with his long-stroke cylinders, power reverse gear, "Monkey" motion, and unusual form of boiler. And who hasn't admired William Buchanan's N. Y. C. eight-wheel engines of the early '90's? Numbered in the 700s and 800s, they were among the finest looking and fastest of their day. They had track to match, and on that track the 999 set her memorable record. The Central's genial Passenger Agent, George H. Daniels, was not one to sit back when publicity material of this calibre presented itself, and soon everyone in the country heard of his road and its famous engine.

Comes now Francis R. F. Brown, the first and almost forgotten Chief Mechanical Engineer of a great system, the C. P. R., and who, in the approximately ten years of his tenure of office, built over 150 locomotives. Yet, insofar as the company's Staff Records Department is concerned, he is apparently non-existent. It has been told the writer that the department stands pat on its statement that, since it has no staff record, Mr. Brown could not, officially, have worked for the company. This is an amazing thing. If a ghost, Mr. Brown must have

materialized for quite some time, for he left many signed drawings in the Mechanical Department, and much other tangible evidence in the shape of real honest-to-goodness locomotives. This situation may have its roots in the fact that high brass had ordered certain M. P. Department records (prior to 1900) destroyed. Strangely, too, search of the early files of the Montreal papers, when the first company-built engine was turned out of the then new DeLorimer Avenue shops, reveals no mention of either the 285 or of Mr. Brown.

Though it's difficult to find much M. P. Department information prior to 1900, we do know that the company-built locomotives of the period from 1885 to about eight years later were as distinctively "Brown" as ear-marks could make them. The several illustrations herein show very plainly the characteristic features that, in his mind at least, constituted a good-looking locomotive.

In 1886 Brown designed the first company-built Consolidations, four of which, 401-404, were turned out that year, and two, 405-6, in 1887. Four Baldwin 2-8-0s preceded them, these being used in helper service out of Field and Revelstoke. The first C. P. R.-built 2-8-0, the 401, is shown in almost her original condition in the accompanying photo taken by the writer at Nelson, B. C., in 1902. This class had 19"x22" cylinders and 51" drivers. Of the total weight of 104,000 lbs., 90,900 lbs. was adhesive. They carried 160 lbs. of steam, quite high for the day, and were fitted with large sand-boxes beneath the cab, for running tender first. These were eventually removed. As to external appearance they represent a midway point between Brown's earlier and later engines.

On May 16th, 1887, Mr. Brown read a paper before the Institute of Locomotive Engineers, when that august body met in session at London, England. This was a lengthy description of the different classes of locomotives he had designed for the C. P. R. and the Canadian climate, and considerable discussion relative to their merits and shortcomings was indulged in, partly due to the radical differences in British and American power. The report and comments on it make interesting reading, and can be found in the Railroad Gazette of June 17th, 1887.

About this time he designed the Moguls (shown in one of the larger drawings) of which the Company built some fifty at its Montreal shops. The 418 was one of these, an 18"x24" cylindered engine with 57-inch drivers carrying 87,000 lbs. of her total weight of 100,000 lbs. Aside from their wheel arrangement and wooden cabs, the engines of this class were much like other Brown engines of following years, clean lines, smooth domes and sand-boxes, no outside pipes to mess up their appearance, and a neat capped stack which was itself something out of the ordinary, in that its lining, or inner stack, instead of having the choke near the base, was contracted at the top. Though decidedly unusual this arrangement seems to have given good results, for the engines proved to be free steamers.

Other deviations from accepted practice were the 180 lbs. pressure, when it was usual to set pops at 160 lbs., the use of Gresham & Craven

injectors, a popular British make, mounted on the boiler head and delivering feed through a pipe extending inside, and over the crown sheet, to the forward end of the boiler. Another unusual feature, one used by Brown in many of his engines, was the method of staying the crown sheet. While this may have been used before, the writer has never come across an example of the kind in connection with the conventional type of boiler, at least not on an American road.

While crown bars and radial stays were both in general use, the latter finally becoming almost universal, Brown supported the forward part of the crown sheet by from four to seven pairs of crown bars; and from these to the back end of the firebox, by direct radial stays. This enabled the placing of the dome directly over the firebox and, according to the designer, did away with excessive strain due to expansion of the forward end of the firebox when firing up.

Engine 418, built in 1888, finally became the 3009 shown in the photograph taken after the 1912 renumbering. She was scrapped in 1922. Engines of this class were used pretty much over the entire system, but no more were built, as 4-6-0s took over the work.

In 1889, Mr. Brown designed and built at the company shops two 10-wheel engines, somewhat in the nature of an experiment, to handle high-speed passenger service between Canada's largest two cities, Montreal and Toronto. This design was interesting on several counts; the 456 and 459 had the largest 6-coupled drivers, 75 inches, in Canada, up to that time; a very short wheelbase, 22 ft. 11 in., less than that of many an 8-wheeler (the standard U. P. 4-4-0s of the day had a 24 ft. 9 in. wheelbase); the front tires were blind, and with a six-inch face, so that the engine might curve easily; cylinders of short stroke, 22 in., kept piston speed down; and side-rods were forged with solid eyes and with oil cups integral.

A handsome steel cab was furnished, the first on the road, possibly the first on a large American main line.* Cab rivets were countersunk and finished flush, as were the front-end rivets, to make a smooth job, while a 1½ inch air space was provided between the outer steel and the wooden cab lining.

The 54-inch boiler was similar to that of the Mogul in that the crown sheet was stayed both radially and with crown bars, and carried 180 lbs. pressure. The total weight was 107,000 lbs., of which 84,000 lbs. were on the drivers. Given shop numbers 1106 and 1117, they became 800 and 801 in the 1905 renumbering.

This design was not perpetuated, due probably to the fact that, while they could run fast enough, they couldn't get a heavy train out of town as quickly as the smaller-wheeled engines. So, in 1912, they were fitted with 18x24-inch cylinders and 63-inch drivers, presumably a more satisfactory combination. Given the road numbers 267 and 268,

* During the 1850s, several engines were built by Norris to the designs of James Millholland, Master of Machinery, of the Philadelphia & Reading. These engines had round-cornered cabs, whose outer surface was apparently of sheet metal. They were illustrated in Locomotive Engineering, of May, 1896. (F. J.)

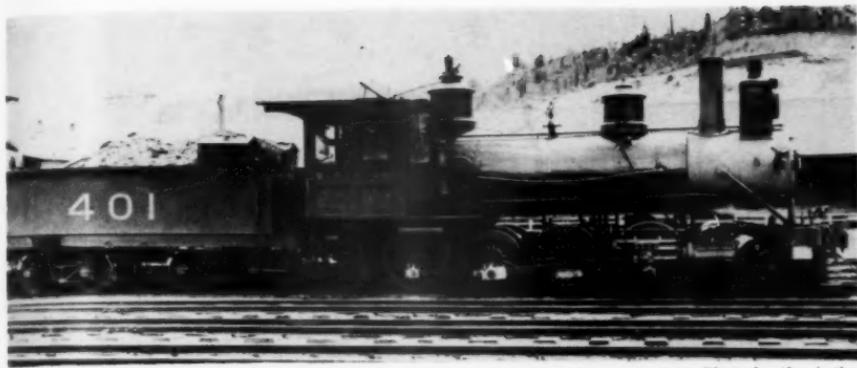
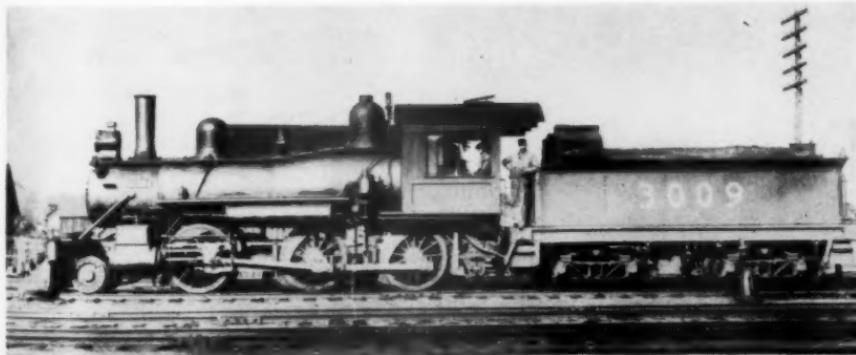


Photo by the Author

No. 401. C. P. R. Builder, 1886. Shop No. 1048. 19x22"-51". At Nelson, B. C., 1902.
Renumbered 1300, 3100. Scrapped 1922.
With new stack and pilot. Rear sandboxes have been removed.



No. 3009. C. P. R. Builder, 1888. Shop No. 1086. 18x24"-58". Originally 418.
Renumbered 1209, 1259, 3009. Scrapped 1922.

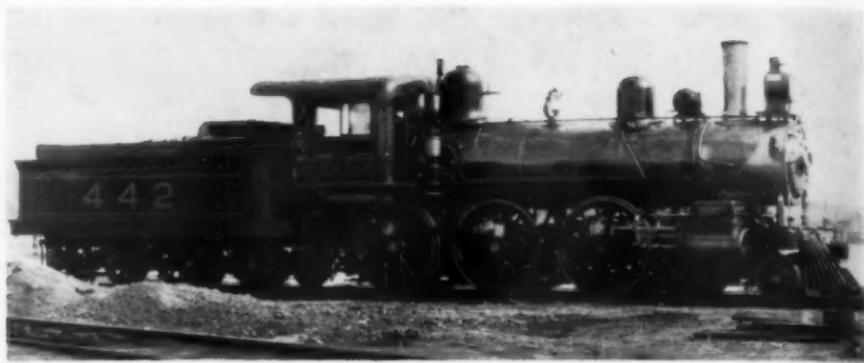


Photo by the Author

No. 442. C.P.R. Builder, 1889. Shop No. 1115. 19x24"-69". Renumbered 808, 2008.
At Vancouver engine terminal, 1902. Scrapped 1930.

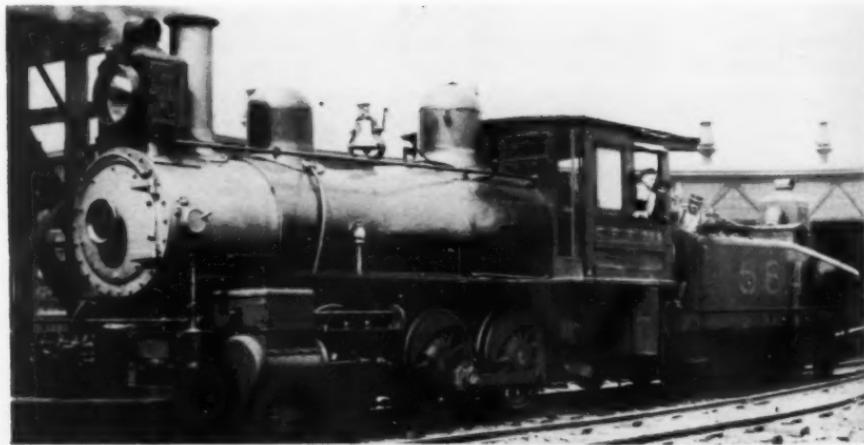
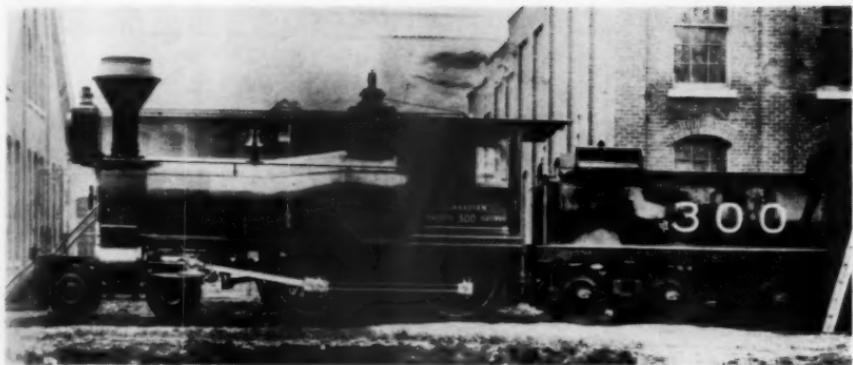


Photo by the Author

No. 584. C. P. R. Builder, 1892. Shop No. 1176. 18x24"-51". Renumbered 2055, 6055.
At Vancouver, B. C., 1902. Scrapped 1929.



Collection of O. S. A. LaVallee and C. P. Ry.

No. 300. C. P. R. Builder, 1884. Shop No. 1016. 19x22"-69". Renumbered 260.

CROWN SHEET STAVING
C.P.R. ENG. #418

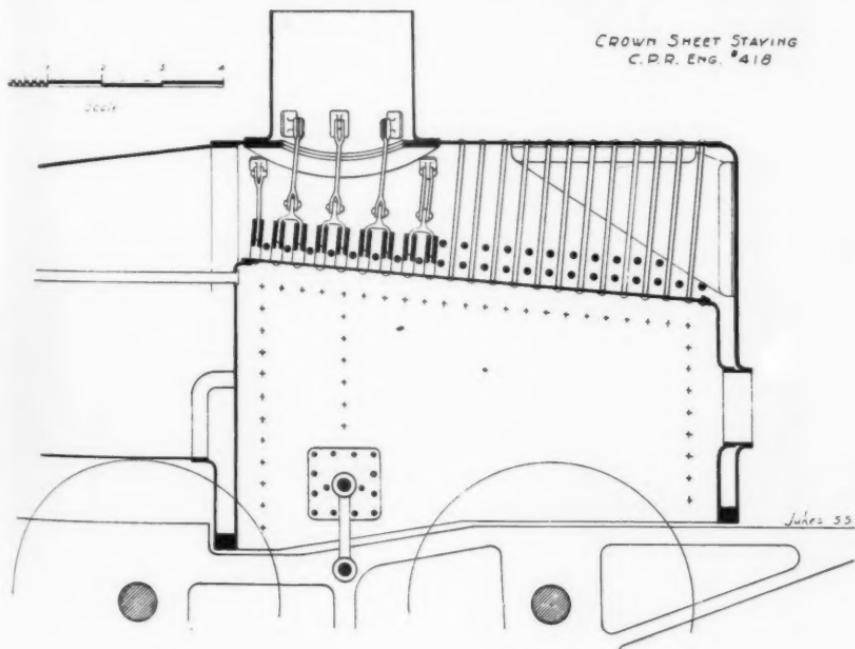
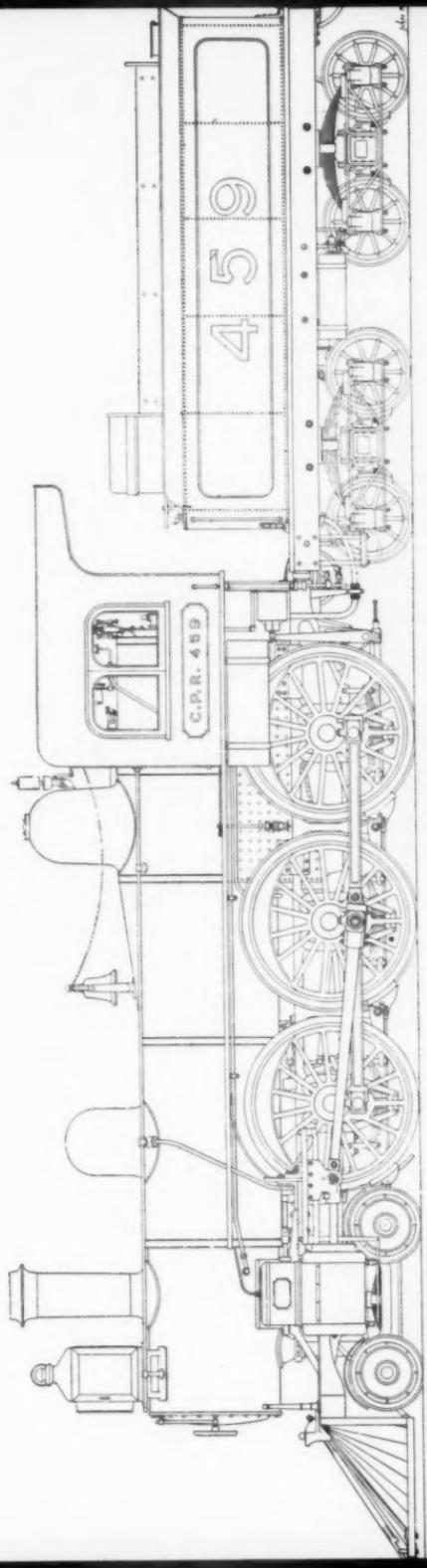




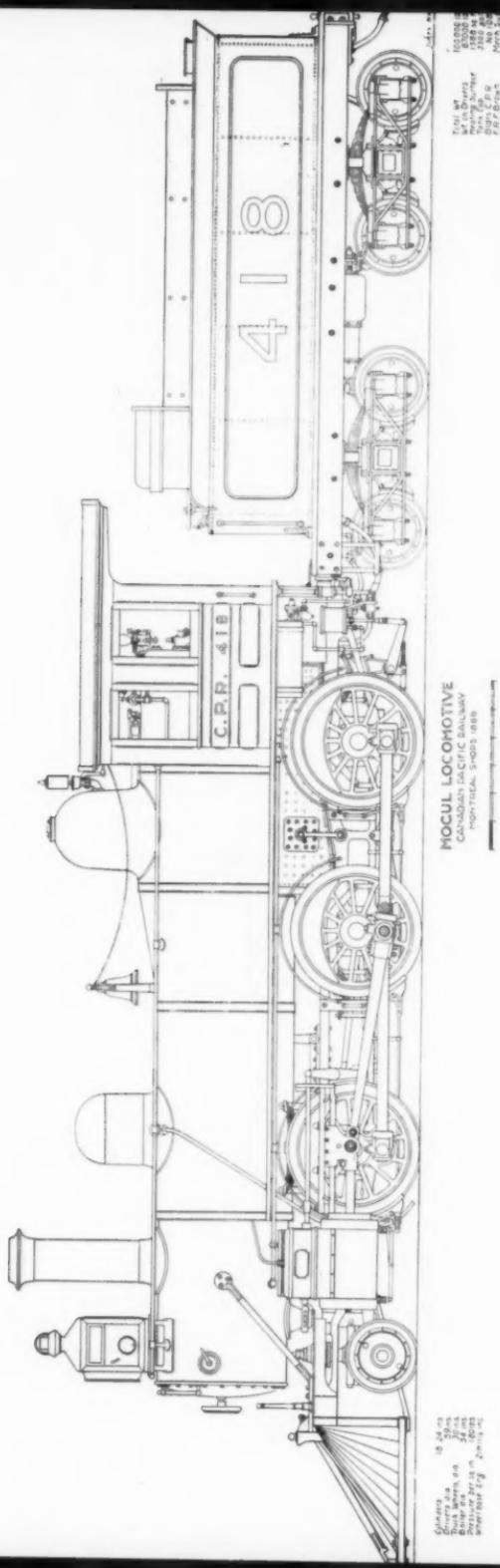
Photo by the Author

Nos. 441-442. At Mission Junction, B. C., 1902. No. 442 with Vancouver-Seattle train.



TEH-HWEA, LOCOMOTIVE
CANADIAN PACIFIC RAILWAY
MONTREAL, QUEBEC, 1898

20x22ms
75ms
50ms
54ms
180ms
220ms



MOUL LOCOMOTIVE
CANADIAN PACIFIC RAILWAY
MONTREAL SHOPS 1885

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they ran until scrapped, the 267 in 1916, and the 268 in 1933; so our old 459 had a useful life of forty-four years.

Another Brown engine is the 442, photographed at the Vancouver, B. C., engine terminal in 1902, after her west-bound passenger run from Kamloops. As shown the engine has a new stack, Pyle-National headlight and MCB couplers. In the photograph of the meet at Mission Junction, B. C., the 442 is shown at the right with her west-bound trans-continental train, while her sister engine, the 441, with the Vancouver-Seattle train heads south from the main line, the latter with her original large headlight. These two were 19x24-inch engines with 69-inch drivers, and were built at the company shops in 1889.

Engine 584 was photographed at the Vancouver roundhouse in 1902. This engine, which has the familiar Brown characteristics, was built at Montreal and carries the company plate on the steam-chest; construction number 1176 of 1892. The road number was later changed to 2055. We notice, too, that the conventional type of injector, with its outside delivery, is used.

The old diamond stacked 300 was the second with that number. One of Brown's earlier designs of 1884, this 19x22 machine had 69-inch drivers and was intended for fast passenger work. The influence of British design shows in the clean boiler, the deck-level running boards, and sand-boxes on top of the latter. This neat little diamond stacker was scrapped in 1931.

These old Brown engines are now a thing of the past, along with the day when a 4-4-0 engine could be bought for from \$8,000 to \$10,000; steel rails at \$28.00 a ton; when sixteen locomotive builders advertised their wares in the pages of the *Railroad Gazette*; when engine and train crews were paid by the trip, whether it took four or twenty-four hours to get over the division; when the engineer was expected to make emergency repairs out on the road; and the fireman was required to keep everything above the running board bright and shining which, of course, included boiler head and cab interior; and another important item, the polishing of the headlight reflector.

The only small, dark cloud in the offing was the possible inroad of electricity via trolley wire or third rail. No one dreamed of the Diesel, but it came in like a lion; and just in time to save many an American railroad from financial deep water. But to those of us who knew the steam locomotive of sixty years ago, there has come the feeling that something very rich has gone out of our lives.

Editor's Note: Thanks to the efforts of Robert R. Brown, our Canadian Representative, we are able to add a few facts concerning the career of the late Francis R. F. Brown:

Sept. 29, 1845—Born at Helensburgh, Dumbartonshire, Scotland.
May 1863—Entered railway service on Great Northern Ry. (of England).

Aug. 1870—Locomotive foreman at Hatfield on Great Northern Ry.
Feb. 1871—Assistant locomotive and car superintendent at King's Cross, London, Great Northern Ry.

Sept. 1874—Assistant locomotive and car superintendent at Egutpoora on the Great Indian Peninsula Ry.
Jan. 1875—Superintendent of motive power and rolling stock at Jubbulpoor, Great Indian Peninsula Ry.
Aug. 1876—Left India.
April 1877—Works Manager at Point St. Charles, Montreal on the Grand Trunk Ry.
July 1, 1883—Mechanical Superintendent of the Canadian Pacific Ry., Montreal.

His departure from the C. P. R. is unknown. Old drawings and reports exist bearing his signature through the end of 1888 and it seems likely that he made his departure in 1890. At any rate, during the years that he was with the Canadian Pacific Ry. he built over 150 locomotives with distinctive characteristics and, they were handsome because they followed straight and simple lines.

Phineas Banning and the Los Angeles and San Pedro Railroad

BY GILBERT H. KNEISS

A hundred years ago, the world was large and young men were restless. Their native farms often seemed unbearably confining. Phineas Banning was only twelve when the Oak Hill manse of his Revolutionary forebears proved too stifling for his spirit and he left its dewy Delaware fields forever.

It was 1843 and the call of the West was not yet very loud. The restless, gangling lad worked for a while in his brothers Philadelphia law office. The city was exciting but the dusty tomes and legal jargon grew more insufferable than the plow. Three years he stood it and then found a job in a house purveying "fancy goods" which he endured for twice as long. It was all very flat, he felt; surely life must hold more thrills in store for a good looking six-footer who tipped the beam at well over two hundred pounds. Perhaps they lay in this California of which the tales grew more and more amazing.

And so, in 1851, the naked Indian whose task it was to carry debarking travellers pic-a-back from lighter to beach at San Diego, strained through the surf under the massive bulk of Phineas Banning and stood him on the sands. Another Indian who had borne the far lighter burden of all his worldly goods, dumped them at his feet. Phineas paid them from his meager cash, waved good-bye to the staid East personified by the stately ship off-shore, and turned to explore the pueblo of San Diego. Henceforth he would be a westerner, and he was free, white, and not quite twenty-one.

San Diego seemed to offer little. Young Banning wandered northward to the Queen City—*El Pueblo de la Reina de Los Angeles*—an adobe hamlet that differed little from the other town but showed a few more signs of possible activity. Here the firm of Douglas and Sanford, partnered by a couple of horses and a half a dozen mules, handled the entire freight and passenger traffic to the harbor. Soon Banning was perched on a high clerk's stool, disconcertingly similar to the one he had warmed in his brother's dreary office, immersed in bills of lading and passenger bookings. His wanderings were over—both geographically and vocationally. From now on he was a transportation man.

In this sunny land of Southern California, which as yet bore scant evidence that it had become part of the United States, Phineas Banning followed the approved Horatio Alger path. He applied himself industriously to his job and was handed more and more responsibilities. He married the boss' daughter, lovely Rebecca Sanford. He was given a chance to buy into the firm on easy terms. Soon he was its presiding officer and then it was the Banning Line.

But it was more than the Alger equation of principles plus elbow grease equals fame and fortune. It was vision and imagination, and reckless courage, too. Watch him as he lounges on the box of one of his

new Concord coaches behind six sweating, panting mustangs at the rocky summit of San Fernando pass.

It is the winter of 1854 and he has a mind to extend his service from Los Angeles to Fort Tejon. There is no road but the old Mexican pack trail over the mountains and none of his drivers, all neck-or-nothing madcaps, are quite touched enough to try driving a stage coach over that. None but Banning had questioned their unanimous answer—that the trip was obviously impossible. But here he has successfully driven the first leg himself; up the sage and yucca plastered mountainside, though the nine rash travellers who booked passage with him have trudged afoot behind the coach rather than woo apparently such disaster.

While the mustangs catch their wind, the "passengers" plead with him to call off the mad attempt. Most likely, he would be glad to, could he do it gracefully. For before him gapes a precipice of many hundred feet and the thin crooked trail winding downward is risky for a loaded burro. To attempt it with a coach and six seems suicide. But Banning just laughs:

"It's quite all right," he assures the others, who although exhausted from the climb, show no signs of wanting to ride. "A man who couldn't drive a stage down that hill is no driver at all! He should confine himself to driving ox teams in the valley!" He cracks his whip and tightens on the ribbons—coaxes the quivering ponies to the brink—and then they are over and thundering down—down—down! First the horses are in the lead—then the coach—mostly they plunge abreast down the steep mountainside. White-lipped, the passengers follow, looking for the corpse. In a chapparel thicket at the bottom they finally reach a welter of leather harness thrashing horses, and the splintered fragments of an erstwhile graceful Concord coach. In the center of the mess is Banning—helpless with laughter! "Didn't I tell you, gentlemen?" he giggled. "It was far less difficult than I expected!"

That coach went no further toward Fort Tejon. Years later, the Southern Pacific crews found its remains as they holed in the San Fernando tunnel. But the crazy stunt served Banning's purpose—it stirred the drowsy merchants of Los Angeles to raise funds and build a decent road.

But despite this adventure and a sad-fated gesture toward the Salt Lake trade which Brigham Young promptly put the sign on, Phineas Banning's interest lay mostly in the twenty-two miles separating Los Angeles from the Ocean. Headquarters of the firm were in San Pedro, traditional port of the Queen City, but a squalid, standstill hamlet that irked his progressive soul. He found a kindred spirit in John Gately Downey, Collector of the Port, who had come from Ireland to Los Angeles to be a druggist, but found it much too tame a life for the surroundings. There was a large tract north of San Pedro on the market—it was too much for Banning to swing alone, but he and Downey managed to purchase it together and to divide it between them.

In 1858 Phineas Banning gave expression to seven years' disgust with unprodable San Pedro and founded his own town three miles north on an arm of the Bay reaching into his new land. With a thought for

his native Delaware, he named the place Wilmington. With a second thought about what the interest of Uncle Sam could do for a new-hatched city, he promptly donated some of his surplus acres for an Army base. It was a smart move—Washington not only created Drum Barracks in Wilmington its principal military depot in Southern California but also became immediately interested in improvement of the harbor. There was a war coming on.

In his new village, Phineas and Rebecca built themselves a proper mansion and assumed something of the baronial hospitality of the fading Spanish ranchos. Almost nightly his twinkly blue eyes and his young wife's were separated by a long festive dinner table and a host of friends and guests—conversation sparkled like the candle beams on crystal while soft-footed Mexicans padded around with serving dishes and kept the glasses brimming.

And to Wilmington Banning also moved the terminal of his stage line and his wharf and lighter business. These were likewise conducted with some ceremony and formality of detail. Newcomers debarking from the *Orizaba* or the *Oriflamme*—old side-wheelers that made weekly trips to San Francisco—found his coaches waiting on the dock when the little lighter *Clara* brought them from the anchorage. Hard-bitten ex-sailors sat on the drivers' seats, normally already spirituously fortified against the coming breakaway. Four mounted Mexicans helped each driver control his team of broncho mules. Two of them flanked the leaders, with lassos tightly drawn to guide, the other pair were "mule-whackers" and held positions just ahead of the coach, their reatas poised to lash the beasts at the word "drive!" All four looked like deserters from the crew of Captain Kidd. Another Mexican, the major-domo, was in command of both stages and savagely checked each detail of the preparations for departure.

In the role of host, Phineas Banning strolled casually among his passengers with a basket full of black whiskey flasks on his arm. These he courteously distributed, explaining that no water was available along the road to Los Angeles. At last all the passengers were seated and their luggage stowed away. Most of them had been talked into betting fifty bucks on their coach to reach the city first and the greenhorns present were nervously wondering just what they had gotten themselves in for.

"Mind your helm, lads! Let her drive!" Banning roared. "*Suelto carajo*" snarled the major-domo. The whackers lashed their reatas on the nearest hinny flank and there was a mad scramble of flailing hoofs. Off the wharf for Los Angeles dashed the cavalcade, the pair of half-tight sailors driving the dozen untamed mules, the eight swashbuckling mounted Mexican conductors with the major-domo, and the two coaches crammed with clutching, bug-eyed passengers choking in a dust-ridden inferno of bucking and kicking, beating and yanking, bouncing and jolting, and hispanic and nautical cussing.

Neck and neck they galloped, but about halfway in, the drivers pulled to a stop. There was a truce in the "race" while they "spliced the main brace" and Banning's whiskey flasks were tipped by all. All,

that is, except the mules and horses—they panted thirsty until they were galloping off again finally to dash down San Pedro Street with a motley pack of yelping, snarling curs trailing them as they drew up at the Bella Union Hotel about the time the steamer whistle on the roof blared the dinner hour.

Stiffly the travellers climbed out and gazed around them at the unprepossessing village to which they'd come. No city in the United States was less certain of its destiny than Los Angeles in the sixties. And in few American towns did so little of the population care. A hundred of the "leading citizens" (and there weren't many more than that) earnestly begged the Legislature to scrap their city charter as a most unnecessary extravagance. All needs of the community, their petition cited, were amply met by the two Justices of the Peace and their roving constables—all four outside the municipal menage and paid by fines charged the culprits they hailed before the *juzgado*. The city *zanjero*, who ruled the irrigation ditches feeding muddy Los Angeles River water through the streets and drew half again the salary of the mayor as befitting his much more important job, could also be paid by fees. No further officials were needed, and why tax the public to support a horde of lazy bureaucrats?

And it certainly did not look like much of a city to our new arrivals. A few brick stores; the rest stained, cracked adobe hovels floored with down trodden earth. Streets of the same adobe in the form of either mud or dust depending on the season and the state of repairs of the *zanjas*. To the north the jagged Sierra Madre looked like adobe too. It was still a Mexican pueblo and the Angelenos dozing in the slovenly streets and doorways protected from the hot Southern California sun only by swarms of flies liked it the way it was. They were Mexicans too—most of them—amiable, indolent, and extremely gracious.

But it was also, notwithstanding, the toughest town in an age of six-gun barking border towns. From the played out northern gold camps had drifted the creme de la creme of the riff-raff. They made the soft, star-lit nights hideous with their carousing, shooting, and general hell-raising and if you were tired of life an unarmed stroll after dark would likely end it for you.

Below this white trash in the social scale a couple of thousand Indians, whose tribal village had once occupied the place, still hung around—apparently for lack of anywhere else to go. Saturday nights these unfortunates whooped it up in the low dives and aguardiente mills of Nigger Alley and the *juzgads* hired them into bondage weekly to work off their resulting fines.

And besides all these there were a few earnest Americans who somehow thought they saw a future in the place. It took a lot of shining faith. The burg was 22 miles from the ocean and there was no decent harbor when you got there. There wasn't any industry, nor any excuse for any. The old grandees had seen their purses grow fat as the sleek cattle they had shipped north to the hordes digging for gold, but now droughts were starving off the herds. The population of the place was still about 5,000—no gain since the Stars and Stripes was hoisted in '48.

Even villages like Grass Valley outranked in the list of California towns. It was not at all impossible that Los Angeles might shrivel up and die.

Phineas Banning had considered promoting the tendency toward such shrivelling up and death. His prosperity had brought competition and the Tomlinson Line had opened up from the old San Pedro terminal, meeting all the steamers and cutting into his juicy business. No one who has enjoyed monopoly is apt to welcome a rival and Banning liked it not at all. His first impulse was to groom Wilmington as the metropolis of Southern California—to switch the county seat and all the activity that went with it to his own town and leave the City of the Angels to be gathered to its namesakes. Then Tomlinson could have the traffic to this projected ghost town and welcome to it.

Wilmington was a Banning town with Banning industries and stores—he had started a steam saw mill, the Union Wagon Factory, and one of his clerks, a disappointed gold-seeker named Eldridge Hewitt, was editor of his Wilmington *Journal*. The Army had quartered ten companies at Drum Barracks. The town was well located on the harbor, and already was a livelier spot than the city, though banks of flies and mosquitos split the day and night shifts and ocean breezes kept the dust swirling instead of settling in somnolence.

The idea was alluring and he dismissed it with some regret after talking with his friends. They figured that even if Los Angeles wasn't a seaport, its situation at the junction of several broad, rich valleys made it the natural business center. And it had a goodly start—in population, commerce and tradition. But the real essence of Banning's decision was that he discovered he had fallen too hard for his new home of Southern California to desire to injure any part of it. On the contrary, to built it up would be his aim.

If he could replace his coaches and mud-wagons with something better, that would build up Los Angeles, and build up Banning too. An English steam traction engine was being demonstrated in San Francisco's streets. He bought an option on it and the schooner *Lewis Perry* brought it to Wilmington in July, 1860. The behemoth may have been a snorting success back in its native Leeds but all Banning's men couldn't coax it over the wretched road to Los Angeles.

The steam wagon flopero convinced him that a railroad was the only answer to the problem. Don Abel Stearns was in touch with Eastern capital willing to build it if healthy subsidies were to be had. The Legislature granted a franchise on May 17, 1861 "for the purpose of construction and maintaining a Rail Road from the City of Los Angeles to the Bay of San Pedro" but the proposition fell flat on its face. There was no support and plenty of opposition. Obviously, the time was not yet ripe. The flag had been hauled down at Fort Sumter and Southern California was largely Confederate in its sympathies. John Downey was now Governor of California and handed his friend Banning a general's commission in the National Guard. Serious trouble was feared. The railroad would have to wait.

Two years later, all still quiet, they tried again. Asa Ellis, local assemblyman, got a bill passed authorizing the County Supervisors to

vote a subsidy to the tune of \$100,000, the Los Angeles City Common Council half as much. All this accomplished was to make the opposition vocal.

Those of the community content to vegetate—a wide slice numerically and financially, fought the idea with bitter hatred. It meant bankruptcy, they shook their heads, a train every fortnight would more than take care of the traffic. Holders of the large ranchos thought more about increased assessments than future values. Farmers saw the railroad only as ruin for the market for hay and oats. Of course, San Pedro folks were unanimously opposed. Trains out of Wilmington would put the Tomlinson stages out of business and their town would resume the slow decay that had set in when Banning left it. The anvil chorus was overwhelming. There was no use trying to put over the bond issues the Ellis Act had authorized.

In 1865 General Banning, now a widower in a lonely house, decided to be a State Senator. The railroad opponents electioneered wildly against him. Led by Tomlinson and the *News*, they harped on his brief flirtation with the idea of building up Wilmington at the expense of Los Angeles and charged this was still his nefarious intent. Soon they had an ugly whispering campaign whipped up in the Bella Union Bar, the Wine Room, and General Red's Saloon across from the post office, where Angelenos congregated to talk politics over aguardiente and corn. Banning could not ignore it any longer. To reinforce his official denial, he moved his Wilmington *Journal* to the county seat with the appropriate change of name and masthead. Three weeks after his election, however, the "*Los Angeles Journal*" resumed its former style and quarters.

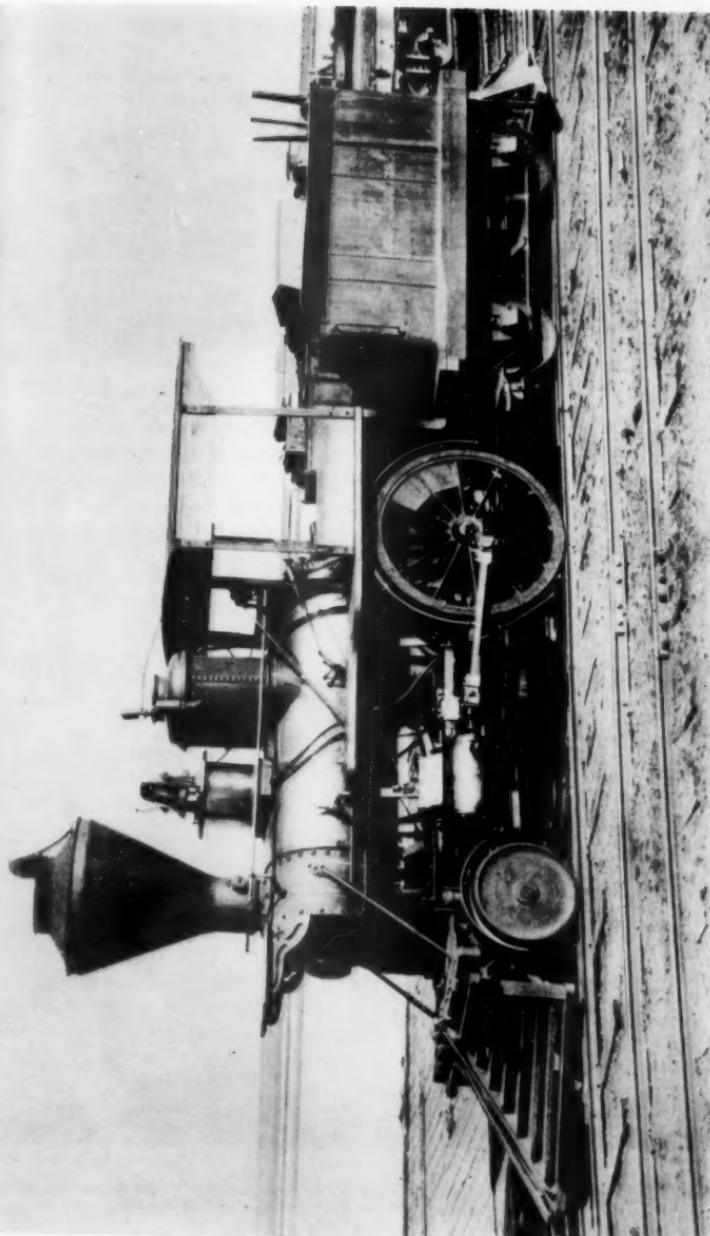
Senator Banning introduced another railroad bill in the Legislature in 1866. It passed without difficulty. There were never any obstacles to the Los Angeles railroad in Sacramento. But firing the Angelenos with enthusiasm for progress was like steaming up a cold locomotive with a candle under the crownsheet. However, the Senator was quietly converting some of the biggest big-shots in Southern California to his cause. In Downey, he found, as usual, his staunchest friend. The ex-governor believed fervently in the illimitable future of the Southland, his years as Collector of the Port of San Pedro had focussed the urgency of better transportation on his mind, and—the personal angle—the track would bisect his portion of the San Pedro rancho. And when two years later the Legislature passed the final Banning Bill again providing for the subsidies, John Downey was one of the three incorporators.

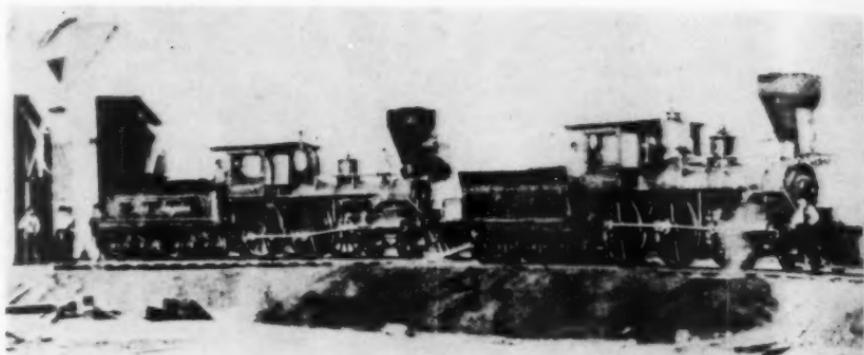
Now it would be discovered whether the Senator's missionary work of the past seven years had saved enough souls to the railroad. The incorporators of the Los Angeles & San Pedro Railroad at once asked the Supervisors and the Common Council to order a bond election. Assessed valuations had risen since 1863 and the amounts requested under the 5% law were \$150,000 from Los Angeles County and half as much from the City.

Both sets of officials obliged. Under the law they had no grounds to refuse. But when the proclamations (in both English and Spanish

Courtesy of Southern Pacific Co.

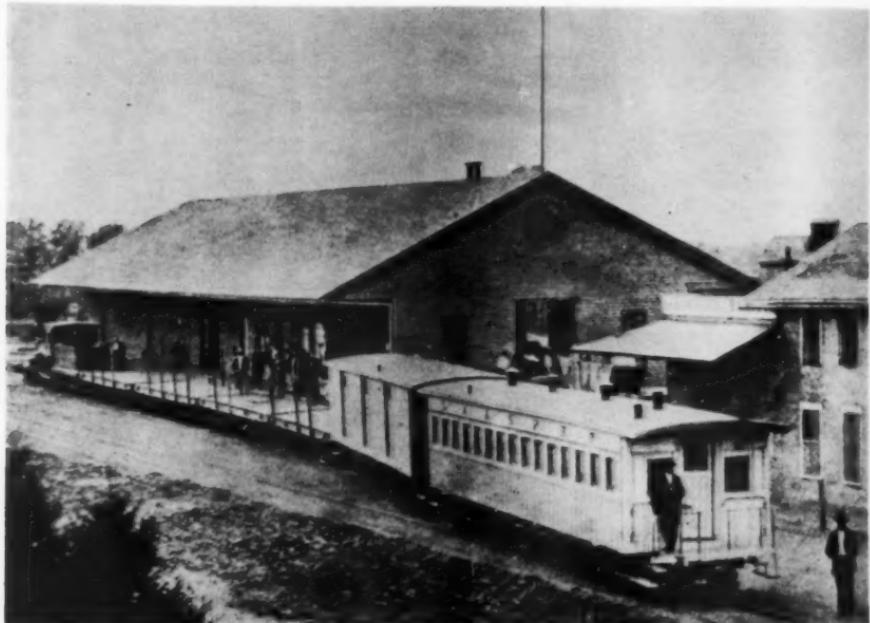
Locomotive "San Gabriel" was the first railroad locomotive operated in Southern California. It went in service on the Los Angeles and San Pedro railroad on January 14, 1869. It broke down before the railroad was completed in October of that year and was replaced by the "Los Angeles." Built by the Vulcan Iron Works for the Napa Valley R. R.





Courtesy G. M. Best

L. A. & S. P. "Los Angeles"—Schenectady, 1869, 12x22" 60"
"San Pedro"—Schenectady, 1869, 14x22" 60"



Courtesy of R. & L. H. S. Collection

First train on Los Angeles & San Pedro R. R., one of the first railroads of California, opened Oct. 26, 1869
Station at Commercial & Alameda Sta., in Los Angeles.

of course) were posted on the squat Spring Street adobe that was both city hall and jail, Banning found they had set the election for March 24th. They'd given him two weeks only to whoop up ardor for a railroad in the voters' hearts.

What he lacked in time, the General and his friends made up for in intensity. They concentrated on the City and buttonholed every man with a vote. They put a County Supervisor and a member of the Common Council on the railroad Board of Directors. John Downey was president and for treasurer, they elected Steve Mott, the deputy county clerk; he had put his last dollar into L. A. & S. P. stock and borrowed to the hilt to buy some more. The appointments were generally popular.

But the opposition was unmuzzled and snarled that the whole thing was just a scheme to make Los Angeles subservient to Banning's lighters for all time. To squelch this as a canard, the Company issued an official statement:

"To the Citizens and Voters of Los Angeles City and County:

Inasmuch as doubts exist in the minds of many re the terminus of the proposed railroad, and many sincerely desire the construction of the railroad but fear the people will still be tributary to the owners of lighters, the Board of Directors for themselves and the stockholders pledge their good faith to carry the railroad to deep water, and in no event shall there ever be any charge for lighterage.....

Los Angeles, March 19, 1868."

This promise plus Tomlinson's sudden death probably swung the election as the race was close and the iron horse barely nosed his cow-catcher under the rope to win the purse. An over-all majority of 28 votes in the whole County (700 to 672) was a pretty slim victory, but it was enough and the Los Angeles & San Pedro Railroad would now become a thing of rails and locomotives instead of talk.

Phineas Banning had labored long and hard to introduce the railway to Southern California and he was determined to build and operate it himself. True, his experience consisted only of a few train rides. Furthermore, he had been dabbling in Mexican mines and was, financially, pretty far extended. But he had arranged a partnership with Henry Tichenor of San Francisco, a lumber tycoon with forests in Oregon and northern California and a fleet of coastwise schooners that moved his product from mill to market. Tichenor was well heeled, he had built logging railroads in his timberlands, and his Navarro River mills could supply redwood ties and bridge timbers.

However, there were others interested in the job of building the L. A. & S. P. Before Banning and Tichenor could even get their bid prepared, the Directors received a proposal from a Mr. Ivers who stated he had built the Napa Valley Railroad. Peter Donahue of San Francisco, who had married Downey's daughter Annie; Ben Holladay, yet to stick his foot in the Oregon door and hunting a ground floor deal

on any railroad scheme; the Robinson brothers of Sacramento Valley Railroad fame—all were whipping up bids with others rumored yet to be heard from.

But Banning retained his confident smile. Besides his personal position in the matter—historical, political, and social—he knew that his fleet of lighters on San Pedro Bay, despite the pre-election statement, would be essential to integrated service on the railroad. And after due consideration of the other bids, the proposal of Banning and Tichenor was accepted. The former had another proposal accepted about the same time—one he mailed to a California girl on a visit to New York. Mary Hollister agreed to be his second wife.

The Partners had agreed to build and equip the railroad from Wilmington wharf to Los Angeles and to throw in Banning's steamers, barges and docks for a total of \$469,000. It was to be paid as follows: Los Angeles County bonds, \$150,000; City bonds, \$75,000; both accepted as par; First mortgage bonds, \$244,000, accepted at 85c on the dollar. As the road was to be 21 miles long, this was \$19,000 a mile plus \$70,000 for Banning's business, viz:

Lighter	<i>Colonel Keller</i>	\$ 7,000
Lighter	<i>General Howard</i>	5,000
Lighter	<i>Lady Jane</i>	2,500
Lighter	<i>Bryan O'Linn</i>	1,000
Steamer	<i>Cricket</i>	10,000
Steamer	<i>General Hancock</i>	4,950
(unfinished)		
5 Boats and skiffs		350
Beacons and Buoys		100
Real Estate		39,000
Total		\$70,000

The railroad was to be provided with two engines, two coaches seating 60 each, two baggage cars, and a couple of hand cars for the section hands. Depots, turntables and water tanks were specified for each end of the line. 45 lb. T-rail or heavier was to be laid and trains were to run by New Year's Day of 1870. Furthermore, (and a most unusual provision in railroad construction contracts which Peter Donahue's refusal to accept cost him his chance at the job) a schedule of maximum rates binding upon "any party who is, or shall be, the owner or owners, or manager or managers of the said railroad, or the incidents thereto" was included at the demand of the public's directors and was also placed in the charter.

Colonel Edward A. Flint was picked for Chief Engineer and by August was in the field with his transit gang. Most of the terrain was flat and bare as a cold tortilla. There was, however, a choice of routes out of Wilmington over the San Pedro Rancho. Dominguez hill could be passed either on the east or west. Flint preferred the former which was called Dominguez route. This line had a maximum grade of 26

feet to the mile, but on the west side, the Lake route through Downey's land was twice as steep and the marsh there called for a mile and a half of trestle. The Governor voted for it anyway and his enthusiasm for the railroad never was the same after all of the other directors but one chose the Dominguez route.

On the night of September 18th, Wilmington turned out. The billiard saloons and grog shops were deserted and the señoritas at "The Schebang" for once lacked male company. Over at the Exchange Hotel, the Grand Railroad Inauguration Ball was in full swing and those who did not rate entrance stood outside and gaped.

The following Monday, General Banning put the weight of his 250 lbs. on a shiny new shovel and grinningly turned the first earth. Ground was broken! The job was under way! 800 tons of railroad iron was on the way from the East and another 1,000 tons was on order at European rolling mills. Up north in Mendocino County Tiehenor's loggers were turning out the ties.

In a month there was three miles of track. Folks dropping in at the construction camp spoke with awe of the armies of man-eating mosquitos that arrived for dinner simultaneously with the hungry men. They observed too that while in the northern part of the State, Chinamen did most of the railroad work, here not a solitary Celestial swung pick and pigtail. But there were plenty of other nationalities helping to build a railroad for Los Angeles—Kanakas, Icelanders, Germans, assorted Scandinavians, and Mexicans from pure Castile to unadulterated Indian. There were Englishmen who looked down their noses at American railway building practices as they followed orders and there were unreconstructed Confederates by the score. As for the late war, Flint had officered in the Army of the Potomac while the Company's secretary, Colonel Chipley, had led troops against his regiment under the Stars and Bars. But now they all worked in harmony.

The smooth progress of the work bred apprehension in various hamlets that considered themselves rivals of Los Angeles. The Germans of Anaheim voted to incorporate their Teutonic settlement and put up \$25,000 toward a railroad from their Landing to San Bernardino. Denizens of the latter burg, who felt their distance from the sea put them behind the eight-ball, responded with bubbling enthusiasm. Such a railroad, gurgled the San Berdoo *Guardian*, could be running inside nine months, and while it wouldn't exactly mean the funeral of Los Angeles, it certainly boded her no good. While, as for San Bernardino—

" . . . we have to congratulate our readers on the brightening prospects before us. Long have we sat by the stream, our hopes suspended on the willows, mourning for the hope that had left us, and praying for the prosperity that would not come. But at length the clouds begin to break and if we cannot hail the glorious orb rising in his brightness and majesty, we can at least detect, through the rift in the clouds, the cerulean speech which brings back hope and gives us cause for rejoicing."

On September 23rd the Pacific & San Bernardino Railroad was incorporated for two million dollars by Ben Holladay. Peter Donahue was one of the directors. Books were opened in San Francisco for stock subscriptions. But Holladay was soon immersed in Oregon schemes and Donahue's eyes were on Sonoma County. The P. & S. B. was forgotten and San Bernardino herself, presumably resumed her mournful stance by the stream where her hopes dangled from the willows.

But on the L. A. & S. P., Christmas saw the roadbed half completed and several miles of rail laid. Three score and ten men sweated in the hot December sun and there was a scraper working for every pair of them. In the womb of Los Angeles, the unborn booster spirit tried its first feeble prenatal kicks. The *Star* recorded its editorial pleasure to

" See our extensive plains being thus utilized, made to bear the iron bands which not only connect us with the ocean, but before long extended to embrace every community in the district and finally become a portion of a great line to the East."

A dozen miles from the city a crop of stakes sprouted like asparagus in the dry fields next to the railroad. It was the first of innumerable "towns" to be thus born. Midway between the terminals, it drew the name of "Centreville" and every single lot sported a SOLD sign before the ink on the tract maps was dry. Soon a forest of scantlings swayed like a bamboo thicket against the flat horizon where thirty homes were shooting up. In Los Angeles herself, substantial business "blocks" were taking form and old Pio Pico, last of the Mexican governors, kept a hawkish eye on the progress of his elegant new hotel. Something had certainly happened to the land of manana!

Phineas Banning's enthusiasm hovered near the boiling point as his rails approached the city. Sometimes it bubbled over. Near Centreville a drilling rig was seeking water. The tools chose an apt moment to pierce the impervious statum that sealed a luscious water sand—the General was just riding by on one of his coaches as the silver geyser started. Banning made one leap from his perch atop of the stage, scooped up a drink in his hands and found the water fresh and cool, then went into an uninhibited victory dance, tearing off his shirt and hugging his astonished passengers regardless of age and sex. He tried to continue the fandango with two girls, helpless with laughter, hoisted on his shoulders but this taxed even the General's physique and the act collapsed on the ground. Such can be the effect of pure artesian water in Southern California.

January 12, 1869 was another day of rejoicing for Phineas Banning and his crew. The schooner *Parallel*, out of San Francisco, tacked into San Pedro Bay and lashed to her deck was the first locomotive for the L. A. & S. P. A couple of days later, tugs nosed the craft right alongside the wharf at Wilmington, rails were spiked down on the dock, and loving hands pushed the little engine over them to the permanent track where crowds gathered to look her over.

Frankly, she wasn't much of a locomotive, for all her bright new paint and the gold-leaf "San Gabriel" emblazoned on her little four-wheel tender. She herself had only four wheels too—a pair of 54 inch drivers under the fresh air cab and a single pony axle forward. Her boiler was only slightly larger than her flaring balloon stack and would have appeared better east furnishing hot coffee at the new Pico House than straining to provide sole motive power on an up-and-coming railroad. This little toy (it only weighed ten tons) had been built some years before by the Vulcan Iron Works of San Francisco, apparently for the Napa Valley Railroad. The N. V. had ordered two of the little "pony" engines but had found them too light for service and Tichenor had likely got her for a song.

Soon the puny San Gabriel was gallantly tugging home made cars of rails and ties out to the end of the track and the clatter of spike mauls neared Los Angeles. As every additional mile of track was inspected and certified, the County issued \$7,000 in bonds to the railroad company and the City matched it with \$3,500 in municipal obligations.

At the corner of Aliso and Alameda Streets, the widow Madigan had a lot. It was 150 feet by 175—just the ideal size and locale for their terminal, agreed the Directors of the L. A. & S. P., as the track would enter town via "The Lane," as Alameda Street was still called, and "El Aliso," the huge sycamore under which Jefferson Davis' camels were tethered in an earlier phase of transportation, was still close to the center of things. But when the widow asked \$14,000 gold they were aghast at the attempted profiteering and secured a lot four times as large from John Downey for \$4,000 less. Of course it was way out in a vineyard at what would be Alameda and Commercial if the streets were ever extended that far and the good folk who lived nearby were none too happy that the retired, peaceful neighborhood might change. They talked some about forcing the iron horse to stay out of the city limits but soaring real estate values put a quick damper on the movement.

In the meantime, Sam Atkinson, superintendent of Banning's carriage and wagon factory had a small force busy building the coaches and baggage cars. Sam had been with railroads in the East before he came to California, but apparently hadn't kept up with things. His coaches were twenty years behind the times with flat roofs and tiny windows. Keeping the solitary locomotive running was a problem. Almost every night the midnight whale oil burned while the General's tired mechanics swore and tinkered at the little iron pony.

For in July the desperate San Gabriel had been put under double duty. Not only must she plod back and forth with the construction train, but Banning had started passenger and freight service from Wilmington to end of track whence his wagons and stages carried on. Somehow, the little coffee pot kept going; by the end of the month, the rails were only four or five miles from the city limits, and her shrill whistle could be heard in town over the brassy waltzes at the Plimpton Roller Skating Rink.

But August's Friday the 13th was the jinx that broke her heart. General Banning had invited some of his Angeleno friends to enjoy the novelty of a train ride to the beach. The *Orizaba* had come in from San Francisco and on the return trip most of her debarking passengers were added to the throng aboard the train. A few, the General had noted with contempt, still preferred to ride in the late Mr. Tomlinson's stages and he made a few sarcastic remarks anent the comparative speeds of steam and his rival's mustang mules.

He had waved his battered Stetson regally as the sputtering San Gabriel overtook the galloping dust cloud that almost hid the stage and grinned complacently as the train riders cheered. The Tomlinson driver lashed his mules in fury but the rocking ears left him steadily behind.

And then disaster struck! The Lilliput-put's bearings were neither designed nor machined to live at such speeds; there was a sudden streamer of yellow smoke, a smell of scorching, and one burned out. The San Gabriel shuddered to a halt and panted helplessly. Like her namesake, she could only blow her horn and to Phineas Banning it must have sounded like doomsday indeed.

We can see his towering figure, first out the door and off the forward platform, tear up to the cab, his long coat-tails flying and a "fate can't do this to me" glint of horror in his eyes. Ben Coleman and Jack Robles, engineer and fireman, shook their heads at him in grim defeat as the trailing guests and other travellers clustered around and stared at the broken down engine. Far to the northward, a vanishing dust cloud marked the stagecoach.

Fortunately, it was not far to end of track and the screaming whistle soon brought the Banning coaches that had been waiting there. The passengers merely had to transfer a little sooner but the Tomlinson stage beat the mortified General and his friends to town by a good half hour and the *Daily News*, whose editor hated Banning, ran a searching editorial headed "Horse Flesh vs. Railways."

This time the San Gabriel's collapse proved too serious for a few hours tinkering. She would be out of service for weeks and work on the railroad came to a standstill. Banning and Tichenor had ordered two full-size locomotives from the Schenectady Works in New York State—the good ship *St. Joseph* had been on the high seas since early March with the first of them, but nothing had been heard of her and she might well be resting on the ocean's bottom.

In desperation the partners tried to buy or rent an engine from Leland Stanford, but the Central Pacific had none to spare and the Big Four were not philanthropists. Meanwhile, master mechanic Polhamus and his machinists struggled manfully in Wilmington to patch up their little percolator and, probably to their own surprise, had her puffing up and down early in September. Tracklaying was resumed. To spare the railroad's embarrassment, the public had been told the hiatus stemmed from the Common Council's indecision whether the track should lie on the east or west side of Alameda Street, or maybe in the middle.

Down around Commercial and Alameda, the residents had seen their fears for the neighborhood's serenity substantiated. The streets had been extended to their crossing at the cost of a lovely orange grove. The noise and traffic of the city swept in—an occasional wagon or hawker. Nicola's Martinez, ice cream freezer balanced on his head and tray of spoons and tumblers in his hand, strode white clad through their streets now, his soft "*leche nevada*" luring the young 'uns like a pied piper. On Downey's lot a single-story frame depot was going up next door to the little grocery store and bakery. A turntable and water tank completed the terminal facilities.

On the morning of September 8th, the first train left the new station for Wilmington. A large crowd was on hand, torn between community pride that Los Angeles finally had a railroad and disgust at the snail's pace beyond which hogger Coleman dared not tax the convalescent San Gabriel. But aboard the train were Phineas Banning and Henry Tichenor and they didn't stop at Wilmington but left on the *Orizaba* for San Francisco.

For word had come that the *St. Joseph* had been spoken and would make port in a few days. Naturally, such an important ship would not break her voyage at the port of Los Angeles. The new locomotive would have to be transhipped to a coastwise schooner and retrace 500 miles of her journey. The partners were going to make sure no time was lost in handling.

It was a month, even so, before they got the new engine to Wilmington and shortly afterward Polhamus had her ready for trial. The New York artist who had decorated her, and probably never heard of the City of the Angels, had spelled her name "*Los Angelos*" on the scroll embellished tender, but no one worried over that. The trim eight-wheeler made her debut in her namesake town on the 22nd with a load of *Orizaba* passengers and was an immediate hit. Now with a dependable locomotive on hand, the railroad could be formally opened.

The Los Angeles & San Pedro Railroad was launched with a last tie ceremony, a grand excursion, and dedication ball. Rising on October 26th, the Southern California sun might have been itself bedazzled, so brightly did the Los Angeles glitter as she stood, steam up, before the Alameda Street station with her train. But for the moment, the surrounding throng had eyes only for the activities slightly behind the rear coach. The last tie, polished California mountain laurel with a plate of burnished silver engraved "Presented by Wells, Fargo & Co. to the Los Angeles and San Pedro Railroad" had been carried out. Banning, Downey, Tichenor and the others carefully laid it in a trench already prepared beneath the rails. The last spikes, plain iron ones, were pounded home as the crowd cheered. The railroad was officially completed!

There was a stampede to get aboard the train. Ben Coleman, up in the cab, rang his bell, pulled the whistle cord twice, and slowly eased the throttle open as conductor N. A. McDonald swung a high-ball. The free excursion to Wilmington was on. Back in the coaches, and in the baggage cars and flats, for all manner of rolling stock was impressed to

handle the crowd, all ages, sexes and races were jammed in good humored propinquity. For most of them it was their first ride on the steam cars and they chattered gaily. They reached the harbor in less than an hour and the empty train returned to town for another load.

For the San Gabriel hauled no happy crowds of gushing excursionists on the big day. She slumped, dejected, in the shop at Wilmington and winced when the cheery whistle on the passing Los Angeles made her cold boiler vibrate. She had slaved her heart out to get this railroad running and now her owners closed the roundhouse doors lest the traveling public be reminded of the painful fact of her existence.

With the second trainload fetched, a crowd of some two thousand Angelenos ranged over General Banning's town. It gawked at his imposing mansion, still without a mistress, paraded up and down Main Street, stuck its noses into the railroad's shops, and inspected the wharves and steamers. It cleaned out the local shops of everything edible, its appetites whetted by the brisk ocean breeze. It washed the pervading Wilmington dust down its throats with aguardiente and other potables. It noted that autocrat Banning's edict that Wilmington dogs be de-tailed at birth to distinguish them from San Pedro curs still was in effect. It poked through Drum Barracks, abandoned in the post-Civil War demobilization. And a large part of it dropped its ready cash to Mexican three-card monte sharps.

The excursionists returned, tired and happy, about nine in the evening. The Station windows glowed with yellow lamp light and inside a military band was tuning up. Colonel Chipley called dance figures until he could hardly speak and it was dawn when the tired musicians laid down their horns and drumsticks. The Dedication Ball was history.

Henceforth, trains ran on a regular schedule. They left Wilmington at 8 A. M. and 1 P. M. and Los Angeles at 10 and 4. On steamer days, however, the timecard was forgotten and the trains made whatever connections the facts of tide and weather dictated. Fare between Los Angeles and the Anchorage was set at \$2.50 as the charter specified. To Wilmington cost a dollar and a half though it was soon dropped to an even dollar. On Sundays, the road ran a round trip excursion for a dollar and monthly commutes were available at \$7.50.

Bonds had been issued to the contractors as every mile of track was finished and now that the whole road was completed, the balance of the issues was turned over to them. Banning and Tichenor, in turn, offered the railroad to the Directors but the Board assigned Keller, King and Hellman of their number to inspect the property and accounts before acceptance.

As to the former, this committee discovered no cause for complaint. The road was well constructed and the equal of any in California. The second Schenectady locomotive, the "San Pedro," had arrived in February, 1870 and with her sister engine provided adequate dependable motive power. The rolling stock built by Atkinson was first class, though a bit outmoded in design, and there was more of it than the contract demanded. The ties were closer and rail heavier than required

by the specs. Banning's lighters and wharves had been turned over to the Company and the unfinished *General Hancock* fitted out with a new engine, rechristened *Los Angeles*, and put in service between the wharf and Anchorage. The Directors were well satisfied with the physical plant and accepted the road on March 9, 1870.

As to the bookkeeping involved, however, there was not the same cozy meeting of the minds. As usual, the owners thought too many extras had been rung in, and a good deal of wrangling ensued on what should and should not be allowed. Banning, with Mary Hollister his bride since Valentine's Day, was too occupied to give the dispute much attention. It spilled out into print after a while when the *Daily News*, always set to take a crack at him, demanded complete auditing of the contractors' accounts. Not too delicately it suggested that the General had bilked the City, the County, and folks in general. Peter Donahue, the paper claimed, or even Ivers with his shady reputation, would have turned out a better road for less money had not the patroon of Wilmington finagled the contract into his own hands. Editor King told his readers the route was roundabout and laid out only to collect payment for additional miles. And he got himself completely snarled in the financial thickets of City and County bonds. First Mortgage bonds issued by the Railroad, Capital Stock, assessed and non-assessed, but was convinced that somehow it all boiled down to fraud with Banning at the bottom of it.

And when the next issue of the *News* ran a statement by the road's own president, John Downey, gently correcting some of King's fiscal blunders, but backing up his charges, a real and unexpected fight was on. He had, he said, voted against the Dominguez route (which skipped his own property) but had been overruled. He agreed his son-in-law Donahue, or maybe even Ivers, would have been preferable as contractors. And he was still fighting, he wrote, against paying for some of the "extras" claiming by Banning and Tichenor. One such was an item of \$6,000 for the battered, exhausted San Gabriel. He had something there. The tax-payers had seen plenty of the San Gabriel but few of them had ever viewed \$6,000. If that was a sample of Banning's bills, perhaps the *News* was right.

A week later the Common Council met. Almost invisible in the cigar smoke haze that filled the little room, Mayor Aguilar pounded the rostrum and told the chawing, spitting, puffing statesmen he was demanding a full scale investigation. A committee was set up to expose all the railroad's affairs to the glaring light of publicity. Without missing an issue the *News* advised them what to probe for. The *Star* arrayed itself on the other side and printed columns devoted to the selfless fidelity of Phineas Banning and Henry Tichenor.

The Governor of California chose this time to issue a most indiscreet statement. The laws authorizing railway subsidies were all unconstitutional, he announced, even though he had just signed the latest one himself. Whereupon Editor King demanded that the City and County bonds be declared null and void.

After several weeks bird-dogging, the Committee of Investigation came in with a bulky report upholding King's charges and recommended suit to be filed to nullify the bonds. After a hot argument in Common Council, the City Attorney was so instructed. The County Supervisors, however, did not take parallel action. Probably they felt it a bit more canny to sit back and see what happened to the City fracas.

About this time, the railroad stockholders assembled for their annual meeting and no one was surprised when President Downey failed to be reelected. Folks planning trips no longer found the L. A. & S. P. timecard printed in the *Daily News*, and that sheet allowed it would also survive the weekly two-bits lost with Banning's cancelled subscription. Deadheads who had lined up with King found their passes voided.

But there was a great deal of anxiety in the hearts of many at the thought of a court fight to nullify the railroad bonds, and it was not confined to the contractors. Investors who had purchased the securities in good faith when the partners sold them to raise construction funds had no idea what their position might be. Up north the San Francisco *Bulletin* editorially implored Los Angeles not to stain her honor with the stigma of repudiation. Banning wangled a special Council meeting to consider repeal of the ordinance requiring the litigation, but the potato was too hot and a quorum did not show up.

Accordingly, the City Attorney filed his action on the last day of May. His complaints differed widely from the line advanced in the *News*, the principal charges in the citation being that by its charter the L. A. & S. P. was committed to reach San Pedro Bay whereas its terminus at Wilmington was merely on a tributary creek; coincident payments had not been demanded from the private stockholders when the City and County blocks had been assessed; and that the City bonds should not have been made negotiable. The second count was knocked out right within the pleadings when it went on to charge Banning and Tichenor with arranging assessments on their stock with the idea of forfeiting their shares and avoiding their liability. The third, true or false, was obviously not their responsibility. All in all, it wasn't too convincing and the Supervisors still showed no intention of taking similar action.

But feelings ran high and there were no neutrals. More than one argument ended when Jones reached for his six-gun or Pancho got pushed in the *zanja*. Ladies shopping at S. Lazard's big store on Main Street forgot the Excelsior corsets that were such a bargain for a dollar and the new white balbriggan stockings to exchange whispered gossip on how the new Mrs. Banning took the row about her handsome husband. Henry Tichenor came down from San Francisco and expressed amazement at the City's suit but entirely confident all his and Banning's actions would be found above reproach.

The latter, noting that the use of some of the bonds to acquire his marine properties was one of the *News'* talking points, offered to return those securities and resume operation of the lighterage business on his own account. But the abolishing of lighters altogether was King's de-

mand and he reminded his readers of the pre-election pledge of a deep-water terminal. Observing that the *Orizaba's* passengers had been delayed two hours by low water on the bar, it jeered:

"That bar is a very unfortunate thing for the travel and commerce of the city and the railroad should either be built over the bar as the taxpayers were informed it would be when the money was voted, or the bay brought up to the end of the railroad. We suppose the railroad is right when it presumes that a Bay is more easily moved than a few miles of railroad built. This thing of detaining passengers two hours on a small steamer halfway between Anchorage and the railroad wharf is anything but inviting to strangers. The railroad company promised to build to deep water, but deep water is a rather vague term and it is quite possible that they feel they have found deep water some five or six miles this side of where that element was supposed to exist and the shallow place commonly called a bar that has the bad taste to intervene should be at once removed. What right has an impudent bar composed of sand and stone, to place itself between a railroad depot and steamer anchorage? And of what importance is the Pacific Ocean if it cannot be controlled by a local railroad company which is determined that its road should touch deep water as they *promised* it should—but then the ocean must come to it. The boundaries of the great Pacific may be extended or contracted at pleasure, but the terminus of the L. A. & S. P. is fixed for all time to come."

The *Star* countered with a complete supplement devoted to "The Present Condition of the Los Angeles and San Pedro Railroad Company" rich in minute detail to show that although some mistakes had, of course, been made, there was no hint of fraud nor malfeasance and the tax-payers had received a much better railway than they had bargained for.

Finally the excitement died down as excitement always does. General Banning had transferred Eldridge Hewitt from editor of the *Journal* to Superintendent of the railroad and he had taken hold as if to the iron horn. The trains ran on time—they were good trains on a good track—the fares were fair and so were the freight rates—and the average citizen could discern little cause for complaint. If the contractors had done themselves some good, *por que no?*

And there were much more stirring matters for Angelenos to be excited about—the crime wave, for example. A masked quartette had stuck up the Santa Barbara stage right on the outskirts of town. Passengers had been relieved of cash and jewelry; Wells-Fargo & Company of their strongboxes. To make matters worse, a San Francisco reporter had been aboard and the news would get printed far and wide. Right down town Main Street was still nightly filled with carousing bums and the shooting was getting worse instead of better. "Why," asked the *Star*, "should Los Angeles sound like hades after dark?" Finally, a Vigilance Committee, 200 strong, took over from the two bewildered constables. An innocent by-stander had been bumped off by a roving

bullet, one Michel Lachemais was accused, and the sheriff had him in the *juzgado*. The Vigilantes battered down the Court House doors with sledges and the careless Michel found himself dangling at the end of a rope in the old corral on Temple Street. Enlargements of the tableau at his demise drew crowds to the Sun Beam Photographic Gallery's show windows for many a day.

In this jolly atmosphere, which was to culminate a year later when a mob lynched eighteen innocent Chinamen while tearing Nigger Alley apart in the hunt for one suspected criminal, a soupcon of financial chicanery—true or false—could not keep the city in a sweat for long.

And so, early in November, the rumor got around that the Common Council was going to withdraw the action. Frantically, the *Daily News* begged that august body not to so stultify itself, but the matter had already been arranged behind the scenes. On December 1st, the Council, with Banning present in the chamber, voted 5 to 2 to order the City Attorney to drop the suit to nullify the railroad bonds. The great investigation was at an end, although the frustrated *Daily News* continued to run charges and innuendos against Banning and Tichenor.

The railroad itself continued to flourish. A typical day's south-bound freight included 9,000 pounds of base bullion from the Cerro Gordo mines up in Owen's Valley, 28 pipes of wine and two of liquor, 26 bales of wool, 11 boxes of pomegranites, 5 cases of honey, 7 sacks of walnuts and 20 of cornmeal. During the first six months of operation about 18,000 tons of assorted freight were handled at about a third of the old wagon tariffs. The little Los Angeles depot was really too small to handle all this traffic. Teamsters complained the grounds were often so jammed with wagons loading incoming freight they had to wait for hours to deliver goods for shipment. To lessen the hazards somewhat, Hewitt had a brick magazine built next to the freight shed for the accommodation of gunpowder in transiit, but the city fathers turned thumbs down on using it. The neighborhood was changing fast, new streets were being opened through, and the rear guard of the vineyards surrendering to warehouses and business "blocks."

Passenger business was equally good. Excursions to Santa Catalina Island began to be the vogue. The little *Vaquero* met the train and made the round trip voyage from Wilmington for \$2.00. Passengers lined the rail watching for the "Catalina Pigeon Messengers" that flew the first air mail to Avalon.

It should not be concluded that the abortive investigation sponsored by the *News* was the only subject of contemporary railroad conversation in Southern California. Possible extensions to the L. A. & S. P., projects for competing roads to build up some other hamlet to the disadvantage of the County Seat, and above all, the ever fascinating topic of transcontinental lines, were very much in the public mind. Naturally, no one was more interested than Phineas Banning.

He had already announced that an extension of his road to Anaheim and then on to the San Gabriel and Santa Ana Valleys was contemplated. The new line would branch off the existing track at Comptonville, eight miles south of the City. Most Angelenos welcomed the news as a sign of further progress, but not so Editor King, who couldn't see Banning

doing anything desirable but cashing in his chips. Los Angeles would sink to way station status, eight miles off the main stem, wailed the *News* and demanded the people "rise in their sovereign power and deal with (Banning and his associates) . . . as the outraged husband of a seduced wife . . . ever dealt (with) the seducer and destroyer of virgin innocence and purity."

The branch remained unbuilt, though not because of King's hyper-hyperbole. The fact was that Banning's financial straits had continued to get tighter; the Sonora "gold" mine adventure was finally finished, but it had come close to finishing Banning too. Few had any inkling of the situation—the flattened pocketbook did not effect his genial good humor nor his energy and determination that the Southland should not roll over and go to sleep again.

He well knew the L. A. & S. P. was but a mere beginning. Without an overland connection, Los Angeles would remain indefinitely a back-water of civilization. To the north the Central Pacific had been running through trains for more than a year, but the winter snow blockades had proven a serious matter. So the Big Four had acquired the Southern Pacific from San Francisco to Gilroy and planned to extend it south and east to meet the Atlantic & Pacific Railroad, the 35th Parallel Route. The 32nd Parallel Route, chosen years before by Secretary of War Jefferson Davis as the best possible trans-continental course, was also still alive; it would terminate at San Diego and likely mushroom that pueblo into a metropolis while the City of Angels drowsed. The few Angelenos who were awake to these things, thought Banning, couldn't afford to close their eyes.

Toward the close of 1870, Colonel Butler Ives of the Southern Pacific passed through with a survey gang and a long pack train. Just as a matter of good engineering practice, he ran a horseback reconnaissance to see if Los Angeles could be included in his route from Gilroy to the Colorado River. The buzz of speculation in the bars and wine rooms hushed up fast when Ives said steep grades and long tunnels would keep S. P. on the other side of the mountains.

This blow to civic hopes Phineas Banning countered by announcing he would extend the Los Angeles & San Pedro Railroad across the Colorado to Prescott, Arizona and direct connections with the A. & P. from the East. He sailed for San Francisco and went into a huddle with E. N. Robinson who had journeyed clear to Wales to scrutinize the Festiniog Railway—the first narrow gauge. Robinson, fired with the fervor of a gospel carrying prophet, enthused that narrow gauge railroads were as much of an improvement over the regular kind as they had been over the old mule teams. He did such a good job that the General organized the California & Arizona Railroad to build from Wilmington to Wickenburg, with a branch up Owens Valley, on a 30 inch gauge. Incorporation was as far as it got.

There was, however, sound traffic reason behind it. The mines of Owens Valley and Cerro Gordo were booming. 800 mules worked steadily freighting the base bullion to Los Angeles and returning with supplies for the mines. It was a nice piece of business for the Angeleno merchants and the two way traffic over the L. A. & S. P. made up a

sizable proportion of its freight haul. At the mines, however, the picture was not so pleasant. The mule teams were almighty slow and the costs staggering. Banning's narrow gauge project sounded good to the operators.

But when months were checked off and no rails were laid in their direction, they grew more disgusted than ever and searched for another answer. San Buenaventura looked like the answer. The mule team distance to this port, since robbed of its first four syllables, was about the same as to Los Angeles, rail haul would be eliminated, and the ocean voyage to San Francisco much cheaper. Rumors of the considerations being given this idea struck the Los Angeles merchants with palsy of the bank account. For wherever the mine wagons trundled their outbound loads, there they would pick up powder and tools, beans and coffee, brogans and work pants for the homeward trip.

Part of the general effort to hold this carriage trade for Southern California was the Railroad Convention held at Anaheim November 18, 1871. Although billed as a local movement to coordinate the transportation ideas of nearby towns, the delegates in Richards Hall were called to order by Phineas Banning and his good right arm Ed Hewitt was secretary. In addition to Anaheim and the city, San Fernando, La Ballona, Los Nietos and some smaller hamlets were represented.

Soon after the opening gavel fell it became obvious that the Convention, like so many other railway meetings, would revolve around the question of subsidies. Local capital was not capable of much railroad building. On the other hand, the large landowners who would have to bear the burden of bond issues were in no mood to encourage further assessments on their property. When Banning gently suggested there might be no other way, they sneered at him as the "mighty boss," abused him as "greasy duke." The General ignored the terms as beneath contempt and coolly explained his conviction that measures need be taken or the commerce of Los Angeles would depart and not return.

Northward, he said, the Southern Pacific was rapidly nearing Visalia, and would get the Owens Valley trade if it was not lost already to San Buenaventura. To the south, the San Diego folks were talking up a railroad to San Bernardino that, if built, would grab the Arizona and southern Nevada business. He had worked out a four-point plan which he felt would save the situation and he had prepared it in the form of a petition that the Legislature authorize a county vote on each section.

1. To donate to the Los Angeles & San Pedro Railroad Company all of the interest of the City and County on condition the Railroad extend its line to a wharf where ocean-going ships could dock.
2. To donate to the Railroad 8% County bonds at \$5,000 a mile for a branch to Anaheim and beyond.
3. To donate to the Railroad County bonds at the same rate for an extension from Los Angeles through El Monte to San Jose, about 30 miles.
4. To donate to the Railroad County bonds at the same rate for a railroad from the present depot to Owen's Valley, about 80 miles.

After some argument including a counter proposal denouncing all subsidies, Banning's resolution was adopted. As usual, the *Star* supported his program and "*The Morning Fault-Finder*" as it referred to the *News*, found grounds only for fears and complaints. But even the *Star* acknowledged that many thoughtful citizens believed any further subsidy should be devoted to a coast railroad to San Francisco. It was heartily in favor of such a road too and restated what was obvious to most Southern Californians—that if such a line were built, the heavenly climate of the Southland would lure thousands away from the Bay City. But on the other hand, if Banning's proposals were carried out, Los Angeles would become so important that San Francisco would have to build the connecting road itself.

Months passed but nothing happened. It became painfully apparent that there was not, in Southern California, capital in private hands or raisable by taxation to build more railroads. If Los Angeles were to be even a whistle stop on a transcontinental it would have to start casting sheep's eyes upon the Big Four or some other fat pursed eligible. Every day's construction on the Southern Pacific made it that much more difficult to deflect that line southward. It was a time to forget personal breaches and Downey joined Banning and other community leaders like Temple, Griffith and O'Melveny in summoning a railroad meeting at the Court House for May 19, 1872.

Four hundred Angelenos gathered under the whale oil lamps in the court room and Downey rapped for order. The meeting, he said, was to lay plans to get the Southern Pacific or the so-called 35th Parallel Railroad to go through Los Angeles—both, if possible. He had come to California when the whole State had 15,000 people; now there were more than that in the County alone—and he was still a young man, he added, grinning his Irish grin. And the County was an empire that would put Portugal in the shade! Half a million souls could live within her borders and not feel all fenced in. But her isolation must be ended!

General Banning followed, and as usual had a resolution in his pocket all ready to be adopted. It dangled the usual subsidy to the outfit making the best offer of main line connections and provided for a Committee of Thirty to handle the whole affair. It would dig up the complete story on every railway proposed to be built on the southern route, would find it whether its promoters intended to hit Los Angeles with a main line, and if not, what inducements would make them do so.

No one stood up to argue against Banning's plan. (The *News* was on its last legs and folding fast). The Committee was selected and Harvey O'Melveny, a Kentucky lawyer, recently come West, appointed chairman. Governer Downey was included and announced he would go up to San Francisco on his own and have a chat with Leland Stanford.

Three weeks later he wrote the Committee a letter. Stanford and Crocker were not uninterested, he reported, but their terms would have stirred a blush on Shylock. The Big Four would run the Southern Pacific through Los Angeles for a 5% subsidy with no strings attached and the Los Angeles & San Pedro Railroad to boot. No branches to

Anaheim, or elsewhere, would be included; Crocker offered to build as many as folks wished; however, at what he laughingly called cost.

As Downey wrote, these terms were harsh, and a special sub-committee rushed up to San Francisco to see whether they couldn't do better than the old Governor had. They couldn't. Thenceforth, Colonel W. B. Hyde, special agent of the Southern Pacific, sat in with the Committee of Thirty. The Big Four had their noses under the tent.

The County Board of Supervisors agreed to submit the S. P. proposal to the electorate. And then, suddenly, the picture changed. To Los Angeles, amid fanfare becoming to a ruling potentate, came a railroad tycoon who made Leland Stanford look like a small time operator. Colonel Thomas A. Scott, President of the Union Pacific, Vice-President of the Pennsylvania, boss of a network of smaller lines, and known variously as the "Railroad King of North America" and the "Great Railroad Gobbler of the Age" was now planning to construct Jefferson Davis' dream railway—the 32nd Parallel Route. With General Dodge, his chief engineer and a retinue of other supporting notables, he had junketed through Louisiana and Texas evoking continual gala demonstrations from his recent foes in arms for the Texas & Pacific Railroad. So far the Californians had seemed indifferent to the project, so Scott had decided to lead his cortege to the Coast and whip up some support. Up north, in the San Francisco Opera House, while Stanford, Huntington, Crocker and Hopkins played the courteous hosts and inwardly gnashed their teeth, he had promoted the T. & P. as a curb on the railroad monopoly fast engulfing the State.

The persona and satellites of the Railroad King arrived at Wilmington August 25th. Among the latter were General Dodge, the Governor of Texas, some assorted Congressmen, and an Italian artist. A new recruit had joined the entourage at San Francisco—Peter Donahue. On the dock, his father-in-law Governor Downey waited with Banning and other leading Angelenos to bid King and Court welcome to the Southland.

The whole party boarded a special train and Colonel Scott was gracious enough to compliment the little Los Angeles & San Pedro Railroad. At the depot in town a fleet of carriages waited to bear the royal party to the refurbished Bella Union, where the local boys had arranged a late breakfast of wild turkey, venison, baked hare and turtle and impressive quantities of chilled California champagne to slush it down with. The King observed that the native peaches were large as the ten pound cannon balls his battery had fired in the Civil War and proceeded to munch one; happily, it did not sit as heavy on his stomach.

We may conclude, in fact, that the cruise south on the *Orizaba* had not touched the great man with mal-de-mer, for with peach, turtle, champagne, etc. beneath his belt, he made a charming little talk. To the climate and the countryside he delivered the expected tributes—it seemed, he said, as if he had been flown to a lush oriental land. But, to the business in hand, while he would stick his oar in local railroad arguments, he wanted to point out that the 32nd Parallel Route was the first one surveyed and it should have been built long before. It was their railroad, he told the Angelenos, and it was coming to them speedily

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and with his blessings. Then, as with all potentates, he had no more royal minutes to spare them, and must be whisked off for San Diego, the terminus of his road-to-be.

Downey had worked out the deal with the Southern Pacific and had urged acceptance of its terms, though harsh, as nothing better seemed to offer. Now he found his son-in-law was hand in glove with Colonel Scott and planning to build, as the Los Angeles & San Diego Railroad, a connection to join the T. & P. Scott, Donahue told him, would construct this road for the 5% subsidy and would not ask that the L. A. & S. P. stock be included. And Governor Downey, as he had two years before and as popularity seekers often do, found himself on both sides of the fence again.

A few days after the Railroad King had taken his departure, the Common Council of Los Angeles met amid its smoke and spittions to pass on the S. P. proposal. A citizens' petition was read requesting that the city railroad stock be donated to the Southern Pacific. An ordinance providing for such action was moved. Just then Downey rushed through the door brandishing a slip of paper through the blue haze. It was a dispatch, he panted, which had just reached him from Santa Barbara, and he read: "Delay action of Council tomorrow on railroad matters. Atlantic & Pacific Railroad have important propositions to make."

What propositions the A. & P. could make to Los Angeles, or why the message should have originated in Santa Barbara, the ex-Governor did not go into. He did, however, deliver an eloquent attack on the plan he had himself initiated. The S. P., he reminded the Councilmen, had threatened to create a rival to their city, and probably, even if they got the subsidy, would—personally he'd die before he'd give the Big Four a dollar under threat. The Committee of Thirty had acted much too hastily, he thought, and he implored the Council to delay action lest a great opportunity be lost.

Harvey O'Melveny, president of the Common Council as well as Chairman of the Committee of Thirty, was not deceived. A railroad from Los Angeles to San Diego, he remarked sarcastically and apparently apropos of nothing. But Downey's request was granted and the vote postponed for a week.

A few days later a counter proposition arrived, but it was from the Texas & Pacific and not the A. & P. For the 5% donation, less the subsidy already granted the L. A. & S. P., the Railroad King would build the San Diego & Los Angeles Railroad. It would run from the City of the Angels to Anaheim and thence southeast to the best point of junction with the T. & P. A special session of the Supervisors was called for the following Saturday night to consider Scott's offer.

Up north, the Big Four began to worry. The Cophetua act being played by the Railroad King and poor Los Angeles did not amuse them. They tried to pressure the Supervisors against allowing Scott's proposal to come to vote on the dubious stand that the pending election on their own proposal was in effect a solemn contract, subject only to ratification by the voters. The 5% subsidy allowed by law having thus already been

pledged, they wrote, "the jeopardizing of what ratification by other distracting and conflicting questions would not be in harmony with that spirit of honor which actuated both parties." The Supervisors, however, voted three to two to place Scott's proposition on the same ballot with Stanford's. What would happen if both carried was a good question.

And so those who shared the sunshine of Los Angeles County—the small merchants on Fort Street, which is now Broadway, the German farmers of Anaheim and the Spanish dons, placid Mexicans and hustling, bustling Americans with dreams of millions in pineapples and silk worms—chose up sides for a contest that through the Fall made the White House race of Grant and Greeley a very secondary issue.

The Texas & Pacific forces were led by Peter Donahue's father-in-law, John Downey, obviously in an awkward position between family solidarity and his craving for popular approval, but not giving an inch. As usual, he was backed by King's fast expiring *Daily News*. But the other papers and most of the county's leaders arrayed themselves with Phineas Banning for a station on the Southern Pacific.

There were things to be said for each side as all but the deaf and bed-ridden soon discovered. The S. P. proposal emanated from a powerful corporation, abundantly capable of carrying out its programs and already running trains southward of Visalia. If irked at a community, it could, as it had demonstrated, leave it to die on the vine while a railroad created rival boomed.

The other offer, granted that it was from a company yet to lay its first rail, promised a shorter and better route to the markets of the East. The solid background of achievement behind Colonel Thomas A. Scott bred nothing but confidence in his great expectations for the Texas & Pacific Railway. He intended to make it, he had said, the crowning achievement of his life. Neither group could be castigated for requiring the maximum legal subsidy, but Scott's demands were not as grasping as Stanford's—he didn't ask the L. A. & S. P. to be thrown in.

The truth was, as the *Star* in a burst of unusual frankness put it:

"geographically Los Angeles is villainously located when viewed in relation to any possible railroad system. We form a cul-de-sac only to be reached by the sacrifice of distance and time."

Downey fired the opening gun. Proclaiming a meeting sponsored by the "Tax-payers' League," he set a pair of husky lads to banging anvils at the Plaza and the ear-rending din plus the flickering glare from a heap of burning cod-liver oil barrels and herring boxes collected quite a crowd. A grand stand had been nailed together before the Court House and here the ex-Governor, after a flowery introduction by Editor King, held forth on the advantages of the T. & P. As for the Southern Pacific, it was true Leland Stanford had referred to him as a "damned fool" when he espoused the Texas & Pacific cause but he harbored no hard feelings—just didn't care for Stanford's "gospel of rapacity in which the tail should go with the hide."

When he'd set up shop as a druggist 20 years ago, Downey said he'd teach the healthy Angelenos to take their medicine and like it, but he couldn't get them to swallow much of this Elixir of T. & P. Too many remembered how strong he had been for the S. P. plan until son-in-law Peter arrived on the Wilmington dock in the court of the Railroad King. The audience was large but sitting on its hands.

The other side countered with a string of rallies, barnstorming all around the County. With a galaxy of speakers and Desmond's Brass Band, they played the Jones Hotel at El Monte, went on to Gallatin, Los Nietos, Compton, Anaheim and Wilmington. Everywhere they got a good hand. The circuit culminated in the largest meeting ever assembled in Los Angeles. It was Saturday evening, November 2nd, and it seemed that all the city was present—male and female too. Up in the velvet Southern California sky, a million stars twinkled, as advertised, but forty new-fangled gas jets around the Court House crabb'd their act. Squinting under the hissing yellow glare, the Southern Pacific's troupe of spell-binders sat waiting on a long platform—above their heads stretched a banner proclaiming:

**"LOS ANGELES MUST PLACE HERSELF UPON THE
WORLD'S HIGHWAY."**

Bonfires blazing along both sides of Main Street had led the way to the affair and preliminary skyrockets and Roman candles kindled a mood for the verbal fireworks, in English and Spanish, to come. Of these the rarest altitude was undoubtedly achieved by Colonel J. G. Howard's prediction that the Big Four, fed up with San Francisco's animosity, would move their base of operations to Los Angeles.

The following Monday night, on the eve of the election, the Downey *News*—T. & P. impresarios staged their last effort at the same platform, but it was a pretty sickly affair by comparison. Instead of the brilliant glowing gas jets, wavering tallow drips shed a flickering light and the program sagged depressingly. One impossible bore held the stage for over an hour with what the *Star* reported as "prudent license of experience buffoonery." When he finally sat down there were few left to go home but the performers.

No one, friend of S. P. or Texas & Pacific, could have fainted from amazement when next day most of the voters reached for the purple ballot favoring the Big Four. It was, for Los Angeles, an unnaturally quiet election day. Not a solitary drunk was hailed into the *juzgado* and only a few were observed on the streets, a phenomenon for which the puzzled Angelenos could offer no explanation. The organized voting blocs stood by under their captains, anticipating the usual bidding for their ballots, but offers came in and they were dismissed just before the polls were closed to vote without pay if they cared to. Whether no "money" was interested or whether the startlingly pure election resulted from the penal provisions of the new State Code was another moot question.

The Southern Pacific proposal tallied 1896 votes in the County—the San Diego plan, 99. In the City the vote was 1093 to 14. The

people of the Southland had, quite definitely, cast their lot with the Big Four.

As events proved, it was a good choice. Although the bargain with the S. P. was a hard one and there were many disappointments that it would bring, it did give Los Angeles main line transportation to the East and to San Francisco—and soon. The Texas & Pacific, on the other hand, never got to San Diego and its exasperated citizens who had been trying to put through a railroad since 1845 when they still belonged to Mexico. The summer following the election saw the panic of 1873 and the collapse of Jay Cooke & Company which put the skids under Colonel Scott, the Railroad King.

This was all in the future but Los Angeles was quite pleased with its decision nonetheless. It regarded itself in a new light—a metropolis on a transcontinental railway. From the *Star* window on Spring Street near First, the place had quite a cosmopolitan air—so much so that the editor made notes on the amazing traffic that passed in a space of only ten minutes right after siesta time. Here is his play-by-play account:

“There goes a hack — a red-whiskered lawyer with a Greeley hat — an *hombre* — a cart load of bricks — another *hombre* at quickstep (a hint at the pace of the others) — four prairie schooners bound for the desert — a little boy — General Howard Sepulveda and the Guirards on horseback — young Garfias — Colonel J. J. Warner — a pointer dog — four boys — three men in quick time — two ladies — one wagon — Don Thomas Sanchez — Miss A — a lame man — a buggy — Judge Gray — a man — Sam Hamilton — two more ladies — a man with a cane — Peel — Frank Howard — a little girl — Holmes — a little girl with a basket — Colonel Chipley — two men — Kuhrts in a wagon — Woodworth in a wagon — five men — two little Isrealites — Dr. Orme — a man on a mule — Tiffany in a buggy — a market wagon — the Bella Union coach — the French consul — a *chiquito* — a squaw — an Indian — five men — a truck — a fat woman — a pretty girl — a man — a girl — three boys — two ladies — a buggy.”

There goes the gun! Not bad for ten minutes.

The Merced Theatre which had opened with high hopes, and closed with none at all, a year before would try again in this new atmosphere to see if Angelenos wouldn't go for something higher class than the stuff put on by the Germans at the Turn Verein. Governor Downey even started a Los Angeles Chamber of Commerce, though it soon folded. One thing was generally agreed, however; the new dignity of the town demanded an end to bathing in the *zangas*. The spectacle of naked urchins splashing around in the streets was not only disconcerting to the female population, but took the edge off water as a beverage. Los Angeles would have to try to learn how to act like a city—a hard lesson and one it would probably never pass with an A.

In the meantime, the little Los Angeles & San Pedro Railroad had attended quietly and efficiently to its business. Now its independent life was almost over and soon its cars and locomotives would be relettered

"Southern Pacific Railroad." Before this happened Phineas Banning threw one more excursion for his friends. He wanted them all to see the progress being made on the new Wilmington break-water; he had personally pushed the appropriation through Congress, travelling to Washington at his own expense.

The Los Angeles and the road's three first-class coaches laden with the city's upper crust sped away from the Alameda Street depot at 10 of a light November morning, out "The Lane" and through the green and gold of the orange groves and the crimson tinted vineyards. In twenty minutes, the train passed Florence—it was a station and eight houses—ten minutes later Compton, which was fully twice as big and boasted not only a store, but a church and a school as well. The Dominguez family *casa* was six miles further and near the enormous rancho of the Bixbys. Then the train was pulling into Wilmington past the Victorian grandeur of the Banning mansion whose owner stood on the station platform with Hewitt to welcome his guests.

The little steamer *Los Angeles* was ready at the dock and the party trooped up the gangplank to be greeted again by Polhemus—advanced now from master mechanic of the railroad to "Admiral" of the fleet. The lighter steamed out through the dredged channel, and while the visitors eyed the seals and waterfowl cavorting on the shores which they alone inhabited, reached the end of the breakwater near Deadman's Island where the Americans had buried their casualties after the Battle of Dominguez only a quarter century earlier.

She made a wide sweep, retracted her way, and landed the party at the Rattlesnake Island section of the job. Here Captain Sears of the United States Engineers explained the details of this project that would allow ships of the blue ocean to come to the ears of the L. A. & S. P. and make Los Angeles a real seaport. He had, said the Captain, a crew of 100 men and seven steam piledrivers and the integration of their SIZZ—PLUMP!; SIZZZZ—PLUMP!; SIZZZZ—PLUMP's! faced the ladies with the problem of keeping their ample skirts from sweeping in the blue mud while maintaining fingers in their ears. 1700 feet of substantial sea wall was already finished and there was more than as much left to go. It would be a real harbor, though mostly man-made, and to no one should more credit for it go than General Banning opined his friends.

The City and County stock in the Los Angeles & San Pedro Railroad was transferred to the Southern Pacific as directed by the mandate of the voters. In May following the Big Four bought out Henry Tichenor and Phineas Banning to become virtually sole owners of the property. They placed it on their books to the credit of the Construction Company and proclaimed that no immediate changes in policy or personnel should be expected. Eldridge Hewitt, Banning's right hand man for years, remained with the Railroad as Superintendent; at length became a Southern Pacific official.

It was almost a year before there was much sign of life from the S. P. toward the fulfilling of its end of the bargain and the Angelenos grew more and more impatient and suspicious. But by October, 1873,

graders and gandy dancers swarmed on all sectors. Twenty miles of main running north out of the City to join the rails from San Francisco to Delano had been graded. The Bridge and Buildings gang had started the span over Los Angeles River for the tracks east through San Bernardino. That town's leaders tried hard to bring the "hopes suspended in the willows" at last down to earth with a subsidy to entice the Stanford quartette; they failed, and the city of Colton is the result. The branch line leaving the L. A. & S. P. at Florence for Los Nietos and Anaheim had also been started. More than 500 men were working on the three stretches and on the 10th of the month the Board of Supervisors delivered 74 \$1,000 bonds for the first ten miles of track.

But it was not until three years later, September 5, 1876, that the last spike was driven at Lang, a whistle stop on the other side of the San Fernando tunnel chiefly noted for its enormous grizzly bears. 1500 of Crocker's Chinamen lined up with shovels at "present arms" while the railroad brass hats, public dignitaries and honored guests enjoyed the approved ceremonials premiered at Promontory. Los Angeles and San Francisco were wedded at last by rail and 350 Angelenos had come through the mountain to see it made legal. The City by the Golden Gate, with twenty times the population, considered it of minor interest and sent 50.

For Phineas Banning it was a very satisfactory day. True, he was out of the railroad game but the completion of the Southern Pacific project was a personal triumph. Much more tangible, however, was his budding deal with Stanford to buy back his Wilmington tugs and lighters. The S. P. had discovered that end of things demanded skills and personnel not readily spared from its far flung operations and was glad to get out from under. Thanks to the ill-fated Sonora mine, the General had no large amount of capital but his credit risk was still A-1. He borrowed \$30,000, half of Stanford's price, and the S. P. agreed to accept the balance out of earnings.

The earnings rolled in, too. The harbor business flourished under the direction of its creator. By proviso of the sales agreement, all Southern Pacific lighterage went to Banning. And so, as head of the Wilmington Transportation Company of the town and harbor, he had built and cherished, the General spent the remaining years of his life. These were few as sickness and accident combined to lay him low in 1885. By then he was again a wealthy man and he was still a well beloved one as the enormous funeral cortege trailing his hearse through the Los Angeles streets testified.

As for the Wilmington Transportation Company, it still flourishes, and though a Wrigley is its chairman, there is still a Banning on the Board. It still operates tugs and lighters in Los Angeles Harbor and carries passengers to Catalina. During World War II it even invaded San Francisco Bay and ran the Maritime Commission's ferryboats full of welders, riggers and the like to and from the shipyards. The old General would have liked that. But above all he would have liked the part played through the conflict by his harbor and the transportation system he started as the Los Angeles and San Pedro Railroad.





More Otto Mears Passes

In Bulletin No. 73, Mrs. Josie Moor Crum contributed an interesting article on the number and the wide variety of the passes issued by Otto Mears to his many friends and associates. As might be expected, they have become collector's items, and as also might be expected, new varieties come to light from time to time. Our member, Morris W. Abbott has submitted photographic evidence of some items which he has acquired.

Of the two passes, the upper is the usual type of silver filigree pass issued in 1892, size $2\frac{5}{8} \times 1\frac{1}{2}$ inches. The lower illustration is a unique silver filigree pass, $4 \times 2\frac{1}{2}$ inches, issued in 1893. It lacks the hand-made soldering of the 1892 passes and all lettering is engraved on the center plate. This could have been an experimental design which Otto Mears gave to his friend and one-time business associate, Charles Tarbell but, note the error of "Silverton Railway Co." instead of "Silverton Railroad Co."

The souvenir sterling silver spoon was issued to honor Otto Mears and his "Rainbow Route," the Silverton Railroad. The pass suspended from it is unique, at least none like it has come to notice. It is made of heavy silver plate, is unnumbered and apparently was never issued. However, it was the property of the same Charles Tarbell who held pass No. 1400. To the left of the word "Silverton," the original shows signs of the wording having been removed. Traces of the letters "M" and "N" lead one to speculate if the name "Moses Liverman," at one time General Manager, might have been erased.

These two passes are of unusual interest and we appreciate the kindness of our member—Mr. Morris W. Abbott in calling them to our attention.

C. E. F.

Elliott's Engines on the Reading AS RELATED TO FREDERICK WESTING

If you've ever read Frank Spearman's exciting stories of the rails, you would have noticed his occasional references to "Reading engineers." For in the distant days of steam, Reading engineers, yes, and Reading locomotives, were in a class by themselves. Two Reading engineers, M. C. Loughrey, on the Philadelphia-New York express runs, and Charley Fahl, on the trains that sped to Atlantic City, were publicly acknowledged to be unsurpassed in their skill at the throttle. Their exploits were the talk of the day and received world-wide notice. Speed and the Reading were intimately associated and the old-time almanacs that used to contain railroad speed records prominently displayed record after record made by the old Philadelphia & Reading Railway.

Even the mighty Pennsylvania was glad to take a tip from the Reading—and profit by it, too! The Reading took a pride in the ability of its locomotives to do a highly efficient job, because, in most instances, they were creations of its own motive power staff at Reading. For here, in this well-known Pennsylvania city, were the company's main shops. Many locomotives were designed and built in these skillfully staffed and well-equipped shops and the success of these engines reflected the exceptional ability of the men responsible for them.

One man who played a big part during a most interesting period of the Reading's steam locomotive development was Edward O. Elliott. For some years he was an elevation man and then became Chief Draftsman at motive power headquarters in Reading. In both jobs he designed locomotives from 1902 to 1915. Some of these engines did much to keep the Reading in the forefront of American locomotive practice. "After about ten years with the Pennsylvania and some work in the contracting business on my own," said Elliott, as we visited his spacious Jenkintown home, "I went back to railroading on the Reading. I started as a draftsman in Reading, and one of my first jobs was working up the design for a double-end suburban tank locomotive." Ten of these Class Q-1 engines were built by Baldwin, in 1903-04. The design was well suited for the run to Chestnut Hill, where engines with tenders could not be turned. This locomotive with its "two-way" operation did away with the need to be turned, and could carry an ample supply of coal and water for the run from Reading Terminal without the use of a separate tender.

The Atlantic Type locomotive had a fine record on the Reading, especially on the Atlantic City Division, where trains were hauled the 55½ miles, between Atlantic City and Camden, N. J., in less than one hour. In July and August, 1897, engine No. 1027, a Vauclain compound, made a record for consistent high-speed running between these two points that set a high watermark in railroading.

For high-speed running, therefore, the Reading looked with a kindly eye upon the Atlantic, and in 1902 and 1903 they had Baldwin

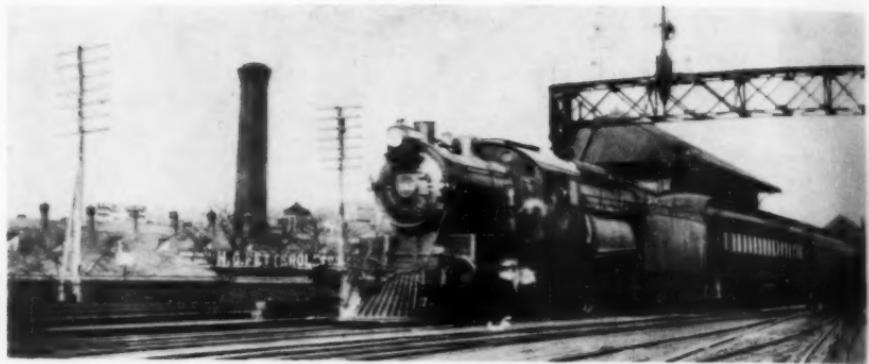


From Schlachter Collection

Class Q1-b. Baldwin 24175, 1904. 20x24-61½". At Philadelphia, November 16, 1916.



P. & R. No. 300 leaving Camden for a fast run to Atlantic City. Three cylinders. Photo about 1911.



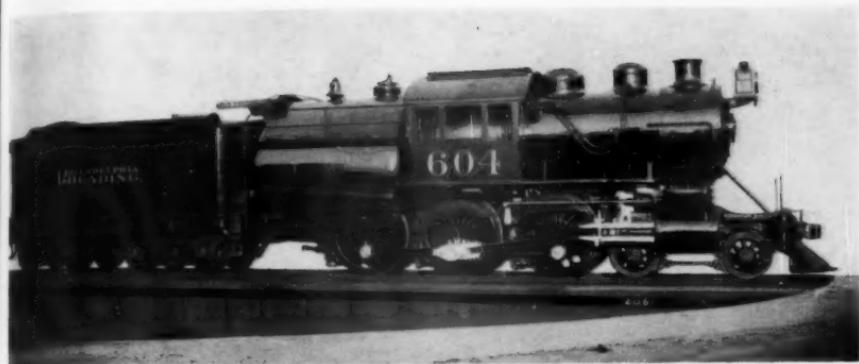
Courtesy of C. E. Fisher

P. & R. No. 343 leaving Wayne Jct. shown as originally built—Class P-5a. Photo 1914.



Courtesy of C. E. Fisher

P. & R. No. 344 leaving Wayne Jct. The third cylinder shows clearly beneath the front end. Class P-5a. Photo 1914.

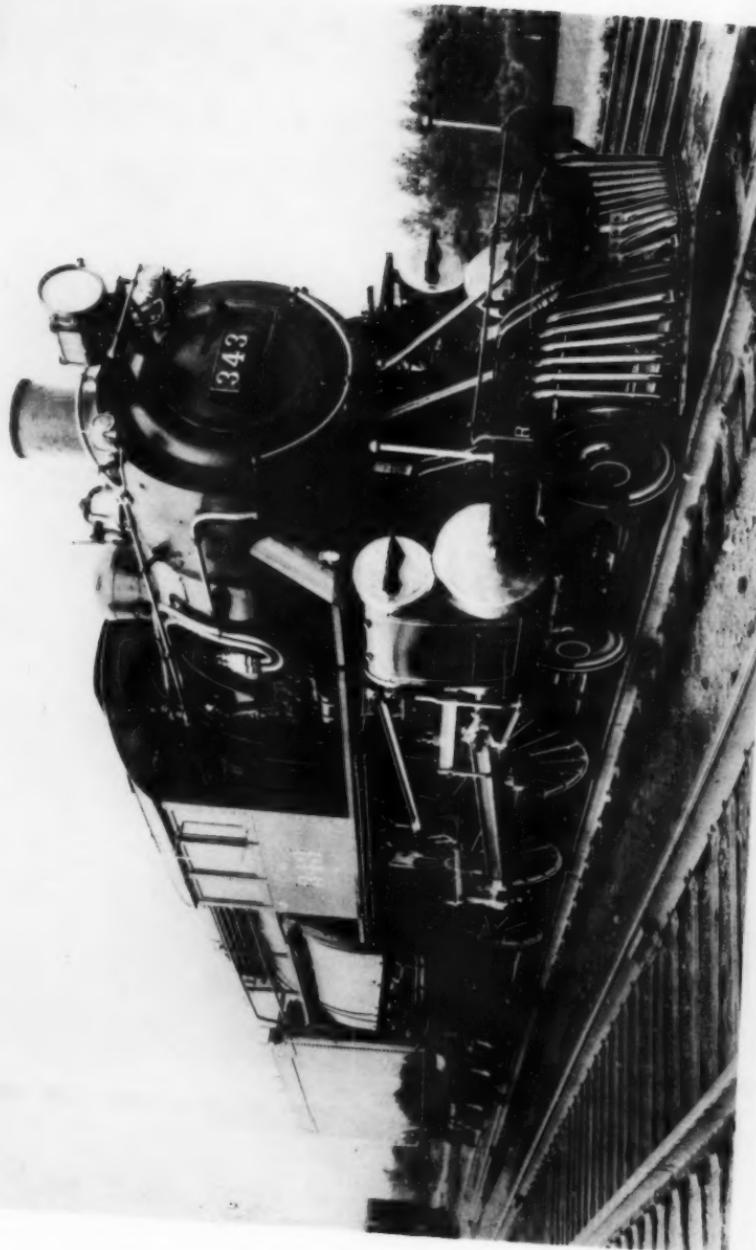


P. & R. No. 604, class L-7a. 22x28" 68½" 214000. Forecast for future freight power.



Courtesy of John P. Scharle

No. 675 as rebuilt with two cylinders. At Reading, May, 1938. 22x26-74". OD 167250; Total 221050; T. E. 31100#.



No. 343 as rebuilt to Class 195, 23-27-86. Rebuilt at Reading, Pa., 1916. Courtesy of the Reading Company.

build them several of these locomotives, both compound and simple. One of these, No. 333, made an authentic record for high-speed running that was phenomenal. With a light, three-car train, the 55½ miles between Camden and Atlantic City were reeled off in 41 minutes, at an average speed of 81.3 miles per hour. At one part of the run, five miles were covered in 2 minutes and 50 seconds, during which the engine hit a top speed of 106 miles per hour. Yes, those Atlantic "camel-backs," with their 84½-inch drivers could really travel. This design represented the joint efforts of the Reading and Baldwin's, and Elliott did not have much work to do on this group.

All of these Atlantics were "camel-backs" or "Mother Hubbards" and featured the wide firebox based on the original patent of John E. Wootten, once the Reading's General Manager. This firebox was arranged for the slow-burning anthracite coal, which required a large, wide grate. The fuel used by the Reading primarily dictated that type of wide-firebox boiler which, in turn, was functionally very successful, and also responsible for the cab's location around the center of the locomotive, or "camel-back" position.

The year 1906 saw the appearance of ten exceptionally fine Atlantics, designed by Mr. Elliott and built at Reading Shops. They had a Class P5 designation and bore road numbers 340 to 349. In accordance with general practice in those days they used slide-valve cylinders and Stephenson link motion, and the large 86-inch driving wheels were an unusual item in their construction. The speediest work was done by these engines on the Atlantic City runs and on the New York Division in the "clocker" and Baltimore & Ohio passenger train service. The latter trains ran between the B. & O. station, at 24th and Chestnut Streets, in Philadelphia, and Jersey City. With the passing of years these Atlantics were modernized to conform to latest developments in locomotive practice; as such they did good work until retirement.

At one time in American railroading the main job of a freight train was to get over the road without too much regard for the time taken to do it. Alert railroad management awoke to the fact that speed in getting a freight train over the line was a real revenue producer; ton-miles per hour, that was the thing to increase the earning power of a freight train—and railroad.

Elliott always held that view and regretted the low "drag freight" train speeds that seemed to be accepted as inevitable by most roads at the time. To give accelerated freight service Elliott, as elevation man, drew up plans for one of the finest camel-back locomotives to ride the rails. This was a thick-set Ten-wheeler, or 4-6-0 type, with 68½-inch drivers, a large wheel for a freight locomotive in those days; but speed is what Elliott aimed for—and got.

These L7-a Class engines, first built in 1905 by Baldwin, replaced the older bituminous coal-burning, smaller-wheeled Consolidations known as "Long Johns." The new engines were the result of a feud between two schools of thought on this question of freight train operation. The L7's used to leave Philadelphia with a freight train at 5 P. M., and arrive at Reading at 8 P. M., which was a great improve-

ment on the slow-plodding "Long Johns," which, with a higher starting tractive force might get off with a few more cars, but then take two hours longer to make the same run. Modern railroad practice has long since vindicated the idea of making the track do more work in a given time and consequently move more traffic. Today's Diesels are geared for this fast freight train policy.

So successful were these Ten-wheelers that they started a trend among the 4-6-0 type "camel-backs" and, for one, served as a pattern for the Lehigh Valley's equally successful J-55 Class of Ten-wheelers. Later these locomotives were equipped with Schmidt superheaters, piston-valve cylinders and Walschaerts valve gear. They were then assigned to passenger service and took over some of the jobs that were too heavy for other type locomotives in heavy local and suburban traffic. The rebuilt version was known as Class L7-sb and did very well, especially on the noticeably "up-and-down" profile of the Bethlehem Branch, in express train service where loads were heavy but speed requirements not too severe. An L7-sb frequently hauled the Philadelphia section of the Lehigh Valley's "Black Diamond."

Around this time a smaller model of the Ten-wheel type locomotive was built for use on lines unsuited for the heavier L7-a engines. Two designs of "camel-back" Consolidations also came out then, but Elliott had little to do with these particular locomotives regarding their design.

THE THREE-CYLINDER LOCOMOTIVES

Elliott was an advocate of the three-cylinder, simple expansion (non-compound) steam locomotive, and, in 1909, a three-cylinder simple locomotive of the Atlantic type, No. 303, designed by him, was built in the Reading Shops. It was a graceful and speedy-looking machine, with three cylinders of the same dimension placed in line under the smokebox. The piston valve for the inside cylinder was driven by a Joy valve gear, while the two outside cylinders' piston valves were driven by a light-weight Walschaerts gear. This steam distribution arrangement was proposed and devised by Elliott, but the company wished to retain the Stephenson valve gear because, as it was put, "we want our variable lead." Later this attitude changed and Elliott went ahead with his own valve gear proposal. The crank pins of No. 303 were set 120 degrees apart, with the inside cylinder's main rod driving the front driving wheel axle, and the two outside cylinders driving the rear driving axle. A divided-drive was thereby produced and helped greatly in establishing the engine's smooth riding qualities; at every revolution of the driving wheels six exhausts just "drummed" out of the stack. No. 303 ran so smoothly that one engineer used to say that that engine nearly sent him to sleep every time he ran it. This locomotive had great power and was outstanding in getting away to a quick start and high speed in a short time.

In 1911, another three-cylinder Atlantic, No. 300, was built at Reading, and duplicated the No. 303 in specifications. In 1912, a two-cylinder Atlantic, No. 344, one of the 1906 Class P5-a, was converted

into a three-cylinder engine. Nos. 300 and 303 used a superheater patented by Howard D. Taylor, then the Reading's top motive power man, but No. 344 was fitted with the Schmidt superheater and had the distinction of being the first Reading locomotive so equipped. In August, 1910, a chart had been prepared to show the average performance of No. 303, after twenty-seven runs with train No. 17, an Atlantic City run. It was seen that for a certain distance on all these runs the speed averaged 93 miles per hour.

Another beautiful three-cylinder locomotive, No. 675, appeared on the scene, in June, 1911, after being turned out of the Reading Shops. It was a 4-6-0 type, and featured the same two-axle divided-drive used on the Atlantics. With its 74-inch drivers it represented an attempt to produce a locomotive nearly as fast as the fleet-footed Atlantics and yet haul a heavier load. For example, two or three additional cars could be coupled to a train on the Philadelphia-New York or Camden-Atlantic City runs, and make the time of a lighter-weight train hauled by an Atlantic. This engine was sent to Atlantic City for exhibition during the 1911 convention of the Master Mechanics Association, and the Reading gained much prestige due to the splendid appearance and workmanship of this fine locomotive. In actual service on the Camden-Atlantic City runs, No. 675 consistently traveled at speeds between 80 and 95 miles an hour, with fully loaded, standard weight trains. There used to be a spot near Pleasantville, N. J., where the Reading and the Pennsy ran side by side; when the Reading engineer would widen the throttle on those sleek and speedy "camel-backs," the Pennsy wasn't in it! Elliott used to frequently ride the engines that showed their heels to the Pennsylvania and, on arrival at Atlantic City, would quickly get off the engine and scot up to the North Carolina Avenue terminal of the P. R. R., just as their engine was arriving at the engine house, and jokingly ask the crew, "What delayed you?"

With those ninety or more square feet of grate area covered with a glowing fire made by that slow-burning buckwheat anthracite coal, the boilers of those "camel-backs" literally reeked with steam and always had more than enough to supply their cylinders. For the Pennsylvania to try to beat those svelte-looking, superbly-performing Reading Atlantics, or a Ten-wheeler like the No. 675, with a smaller Atlantic was optimism in the nth degree! Engine No. 675, Class L10a, had a two-cylinder sister engine, No. 676, Class L10-b, and both were the heaviest 4-6-0 type "camel-backs" on the road. In fact, it was the Reading that brought the Atlantic's speed capabilities to the attention of the P. R. R., and the success of the Reading's engines of this type undoubtedly influenced the P. R. R. to experiment with the center-cab 4-4-2, in 1899, its first and only attempt to use the famous hard coal combination of wide firebox and center cab.

In time circumstances forced the Reading to discard three-cylinder locomotives and change them to two-cylinder engines. To quote Elliott on these three-cylinder locomotives and their discontinuance on the Reading, "Regarding three-cylinder locomotives, their more even turning moment which permits a lower factor of adhesion, smoother and

more rapid acceleration, and milder exhaust action on the fire are well known. However, an additional factor of prime importance, the entire absence of the dynamic augment (sometimes called "hammer blow") with its destructive action on the rails, has not been given the consideration it deserves. Critics of the steam locomotive are continually stressing the dynamic augment. While this does apply to the two-cylinder type, it is absent in a properly designed three-cylinder locomotive.

"A three-cylinder locomotive with crank pins spaced at 120 degrees and with the reciprocating weights of all three cylinders equal to each other requires no extra weights in the driving wheels to balance these parts and, therefore, there is no dynamic augment.

"This method of balancing only the revolving weights was used on the Reading three-cylinder engines built in 1909-1912. The basis for the calculations were found in the book on counterbalancing by W. E. Dalby, a noted authority on the subject. These three Atlantics and one Ten-wheeler had all the drivers cross-balanced, and all parts of the valve gears balanced as well as cross-balanced. The minor weights were contained in pockets located in the wheel rims.

"The correctness of this method of counterbalancing was proven on two counterbalance models, one for the three-cylinder type, and another for the two-cylinder; both locomotives were similar in design except as to cylinder arrangement. The results obtained on the models were further verified when the locomotives were built. The two-cylinder sister engines of both the Atlantic and Ten-wheel types, in addition to having the dynamic augment, could not run within ten miles per hour of the maximum speed of the three-cylinder locomotives without such excessive vibration as to be very annoying. The two-cylinder machines had the conventional compromise, in use at that period, of two-thirds of the weight of the reciprocating parts counterbalanced. On these engines the proportion of the weights to be balanced was only a compromise. Either the locomotive absorbed the vibrations or else the rails and roadway took the punishment.

"If these Reading locomotives were such a success, why were they changed into two-cylinder engines? That is a fair question and this is the answer. The crank axle was in three pieces, of which the crank cheeks and main rod bearing were in one piece; the other two were on the driving box journals. After some six years service and a mileage of approximately 300,000 per locomotive, slight cracks developed in the fillet where the rod bearing joined the cheeks, and it was decided that, due to the high speed at which these engines operated, to replace the center portion. The Bethlehem Steel Company, who had furnished the original axles, were then engaged in the manufacture of ordnance and munitions for the British and Russian Governments (World War I) and did not care to take on this work unless at an exorbitant price. These axles weighed 3,740 pounds and cost approximately 35 cents a pound, or over \$1300.00 when new, in 1909-1912. Under these circumstances the Reading Company decided to rebuild them into two-cylinder engines at a cost less than they would have paid for the crank axle alone.

The original high cost of these axles was due to the fact that the same high grade of material was used in the portion of the cheeks which acted as counterbalances for the revolving back end of the main rod and its bearing."

Despite the ending of three-cylinder operation on the Reading, Elliott remained a booster of such locomotives. In the 'twenties there was quite a revival of three-cylinder locomotives the world over and much fine work was done by these engines. In 1949, Mr. Elliott received a patent for a three-cylinder locomotive which would have removed most of the objectionable features associated with such engines. But, meanwhile, the Diesels had gotten into the picture and had taken the scepter so long held by King Steam!

OTHER ELLIOTT LOCOMOTIVES

In 1912, Reading Shops turned out the Company's first Mikado (2-8-2) type engine, classed as M1-a. The Mikado was the result of the Reading's need to provide more power for moving heavier trains brought on by an increasing traffic in coal. Greater capacity than that available from the "camel-back" Consolidations was demanded. The Mikado's chief advantage over the Consolidation was its increased steaming capacity—made possible by a larger boiler—in proportion to its adhesion. This, even with the same size driving wheel, gave the "Mike" superiority in speed over the smaller-boilered Consolidation.

As first built, No. 1700 used saturated steam, but was later equipped with a Schmidt superheater and reclassified M1-sa. Originally fitted with a wheel and screw reverse gear, it was given a power reverse gear sometime later. For its day it was a giant of a locomotive, with a boiler that tapered in diameter from seven feet at one end to eight feet at the firebox end. Its wide, hand-fired firebox, with its grate area of 108 square feet, had the Reading look, and on the road, No. 1700 turned in that reliable Reading performance.

Elliott was quite active in its creation, but wanted to use larger driving wheels in place of the 61½-inch wheels settled upon. As always, he thought that getting freight moved with greater speed over the road was preferable to lugging around a few more extra cars at "ox-cart" speed. But it was ruled otherwise and the smaller wheels with higher starting tractive force won out. Later this archaic policy was completely reversed, not only on the Reading, but on roads all over the United States. Just before the Diesel era we saw big-wheeled 4-8-4 type locomotives hauling freight trains at express train speed with decided financial advantage. There is no question about it, Elliott's 68½-inch wheels on Class M1-sa would have meant more speed, more ton-miles per hour, and more revenue!

In 1914, Baldwin started to build these M1 Class Mikados for the Reading, and up until 1917 a total of 56 was built at Eddystone. One group, Class M1-sb, used 55½-inch wheels, which upped the tractive force about 6,000 pounds, with a corresponding drop in speed. These engines were stoker-fired and represented the first Reading locomotives so equipped. No. 1700 was changed to a stoker-fired engine, for to bring out the potentialities in such huge engines stokers were a "must."

In American railroading, the year 1914 savored of retrogression, for here was the Pennsylvania Railroad, after going in heavily for the Pacific in 1910 and 1911, going back to the Atlantic to haul the same weight and scheduled trains operated by the heavier locomotives. And here on the Reading, in this same year, we find them going back to the American (4-4-0) type for high-speed passenger service, after having used large Atlantics and Ten-wheelers. The big Reading Americans of Class D11s (the suffix letter "s," as on the Pennsy, meant the application of a superheater) were originally planned to work the Philadelphia-New York "clockers." They were to have had 80-inch drivers for speed, and would be backed up by the biggest boiler ever used on a Reading American type locomotive. This small engine policy made plenty of sense too, at the time. Why build heavier and more expensive locomotives when smaller units were adequate for the work? The smaller locomotive was also less costly to maintain. But, alas, on the Reading it was not to be. The Company's civil engineers objected to the loading for certain bridge panels that the 80-inch wheeled engine would have imposed. Valiant efforts were made to reduce the weight in order to permit the use of big wheels, but it was no go. Meanwhile, ten of the proposed locomotives had been ordered from The Baldwin Locomotive Works. So, down to the big Eddystone Plant of Baldwin's went a man from Reading to take care of the changes involved, although the locomotives were already in shop production when the decision to use 68½-inch wheels became official. However, all was soon cleared up and, by March, 1914, these ten D11s engines had gone into service. Yes, it was at Eddystone where the swan song of the Reading's American type was sung. And a mighty powerful example of that type it was, with its piston-valve cylinders, light-weight Walschaerts valve gear, heat-treated steel for the running machinery, and Schmidt superheater. A power reverse gear was part of its equipment, making it one-up on the Pennsylvania's E6's in this respect. Most of their work in the early days was done on the Bethlehem Branch, where they performed very well. Later they took turns working the Philadelphia suburban traffic until electrified train operation took over in this area.

Reading had never worried much about P. R. R. competition on the shore-bound trains that sped over the 55½ miles between Camden and Atlantic City. But then came 1914 and the Pennsylvania's famous E6s Atlantics in quantity. This was the super-Atlantic, regarded by many as a classic of the locomotive world. There was no doubt that Altoona had created a giantess of Amazonian proportions, and, after four years of investigation, having started in 1910, had come up with a champion. This was no hit-or-miss locomotive, but represented Altoona at its best. As Elliott put it, "Those engines had us worried; we knew that big boiler and all that extra heating surface would give plenty of power."

There was no doubt that the Pennsy now had the jump on the Reading, and it wasn't long before the E6 engines were showing the Atlantic City line of the Reading that they had taken things over. What was to be done? Can't let the Pennsy beat us into Atlantic City!

Should we go in for a big Atlantic, too? These and other questions bearing on the subject were meditated upon by Reading officials, especially Samuel G. Thomson, Superintendent of Motive Power and Rolling Equipment. Thomson thought he could come up with a solution by proposing something a bit on the radical side. Once, on a trip to Europe, he had spied a 4-4-4 type locomotive which seemed to have speedy lines and promising possibilities for high-speed running. He had liked it; so, why not a big 4-4-4, or so-called Baltic type, something on the lines of a Pennsylvania E6? That should do it, and the Reading went to work and prepared the detailed designs of this proposed engine. Four of these locomotives, designated Class C1-a, and numbered 110 to 113, were built in 1915, at Reading. Their boilers carried a 240-pound steam pressure and were fitted with the Schmidt superheater. They had the Reading's customary and modified Wooten firebox with a 39-inch combustion chamber, which was fired by hand through the usual two-door opening. Several unusual items were contained in these locomotives such as triangular, or V-shaped, guides, aluminum crossheads of the alligator type, a wire cable reverse gear operated with a big hand-wheel, and rear frames of welded slab section. But the big point in their make-up was the fact that the front and rear four-wheel trucks were alike in construction, with center-pin bearings to support the weight of the locomotive; also that there was no equalizing or compensating spring rigging between either truck and the driving wheels.

This made the engines very unstable and caused operating difficulties. For example, when climbing over a "hump" or hilltop, the locomotive's weight would suddenly and automatically shift to the drivers to such an extent that the engine was soon running hot; then again, when running over a sag in the track, the weight fell greatly on the two end trucks and off the drivers, causing the engine to slip badly. This happened on the road time and again. Elliott, who had ridden many locomotives at over 90 miles an hour, said that No. 110, first of the balky Baltics, not only frightened him, but actually sickened him. On one trip from Atlantic City to Camden, after a bad-jolting ride, as the train neared the old Camden Forge plant, the fireman—and luckily so—yelled to Elliott, "Hold on," which he did. Even at that, when the engine moving at normal speed hit the curve located there, Elliott was thrown with great force against the side of the cab, force enough to have hurled him from the window, if he had not heeded the fireman's warning. He said, "I took to my bed for two days after riding that engine." In anticipation of high-speed running, an excess of braking power was provided by the cross-compound and single-stage air compressors just above the running board on the left side of each Baltic.

By 1916 it was plain that the Baltics would not do, and they were converted into Atlantics by the substitution of a two-wheel trailing truck of the Hodges patent. A bit of politics was represented here as the New York Central faction that owned a good part of the Reading

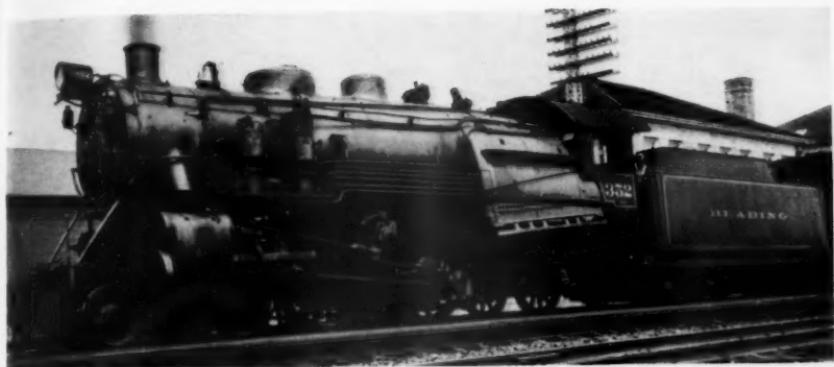
favored this truck. The new truck and its driver-connected spring equalization immediately improved the riding and performance of the locomotives.

No question about it, somebody "goofed" on the Baltics. It was told how the Reading's President plaintively kept asking the General Manager, "But why did you let him build *four* of them?" Elliott was outspokenly hostile to the 4-4-4 design and accurately predicted the difficulties which were later encountered—but to no avail. After their conversion and the removal of some of the "special" items, Nos. 110-113 were renumbered to 351, 352, 350 and 353, respectively, and worked out their days as Class P7-sa, first, and later as P7-sb, giving a fair account of themselves up to the time of their retirement.

After the unhappy performance of the Baltics, the demand for a Pacific became increasingly severe, and in this respect the strongest pressure was put on the Reading by the Baltimore & Ohio. For many years Reading locomotives had hauled through B. & O. passenger trains between Philadelphia and Jersey City. Atlantic type engines handled these trains with great satisfaction, but finally the trains became a bit too much for the comparatively light 4-4-2 type locomotives. Another thing that emphasized the situation was the occasional late arrival of the east-bound trains at the B. & O. 24th and Chestnut Street Station, in Philadelphia. Such a train, when 20 to 40 minutes late, posed a problem for the Reading engine and crew, who were expected to make up a good part of the lost time, if not all of it. This sort of thing required plenty of reserve capacity and a boiler much larger than the one used on the Atlantics. In June, 1916, under the supervision of Mr. Irwin A. Seiders, S. M. P. & R. E., Reading Shops turned out engine No. 105, the Company's first Pacific type. It was classified as G1-sa, had the characteristic Reading wide firebox, 80-inch drivers and, like the Baltics, had its cab placed at the rear end of the locomotive.

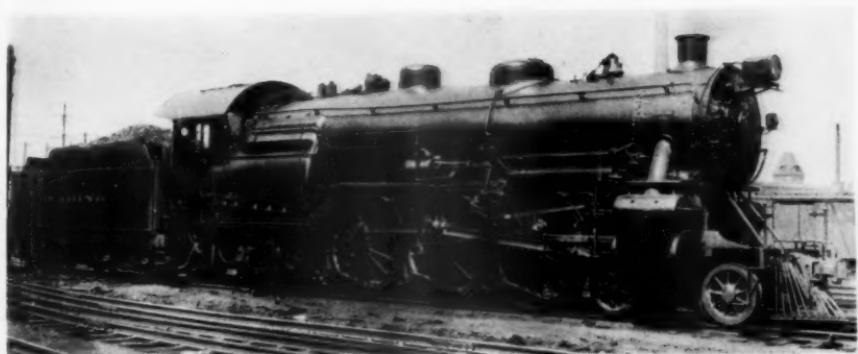
Engine No. 105 soon proved its mettle in heavy, high-speed passenger service, and others like it, and some in a modified form, began to appear. They proved an immediate success in the B. & O. service and also took their place on the Philadelphia-New York "clocker" runs, where they did a great job. But it was on the Camden-Atlantic City 55½-mile, non-stop run, made in 55 minutes, hauling ten and twelve all-steel car trains, that they "had their finest hour."

By this time Elliott, who had left the Reading in 1915, had gone to the New York Shipbuilding Company, in Camden, N. J. Here his fine mechanical engineering ability found ready solutions for the problems met with in marine engine design. After World War I and the tapering off of shipyard activities, Elliott went to the Baldwin Locomotive Works as an "elevation man." It was he who laid out the valve motion for engine No. 60,000, and for three-cylinder locomotive work they couldn't have had a better man. The big P. R. R. K5 with the Caprotti valve gear was another one of his jobs.



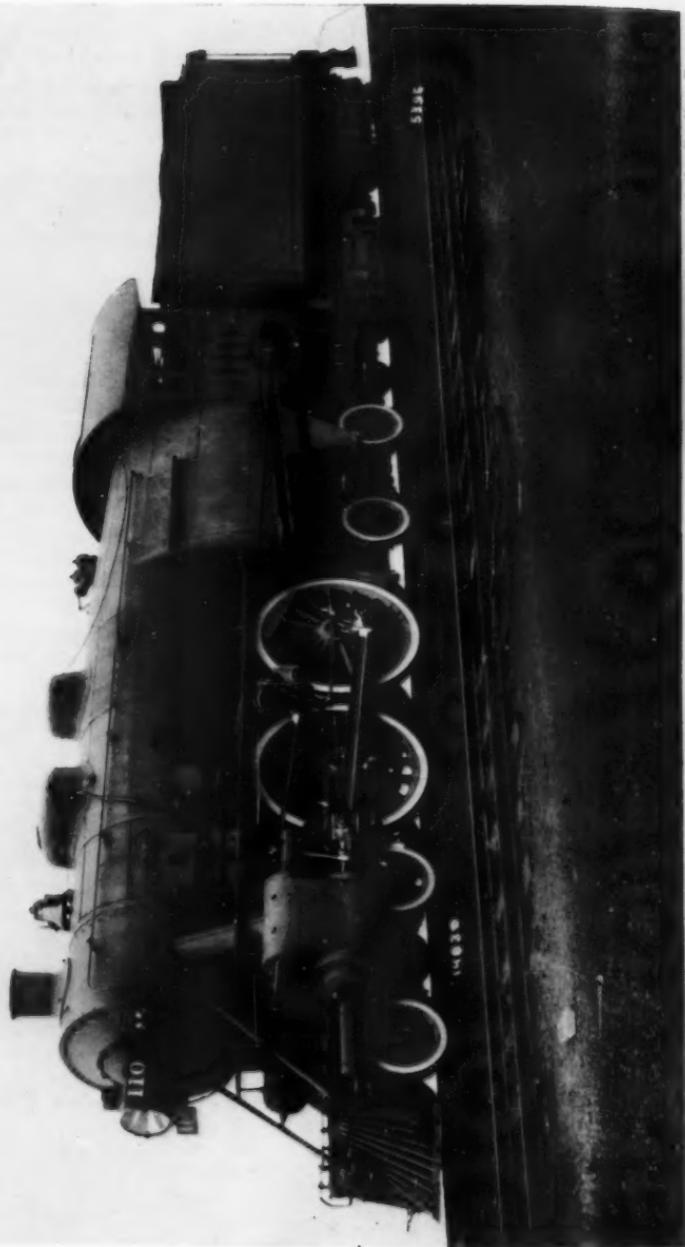
Courtesy of John P. Scharle

Class P7-a as rebuilt from Class Cl-a. Pottstown, Pa. August, 1938. 23½" x 26"-80". OD 129210; Total 231925.



From Schlachter Collection

No. 131. Class G1-a. Baldwin No. 57757, 1924. 25x28-80". OD 176925; Total 273600. T. E. 37185#.



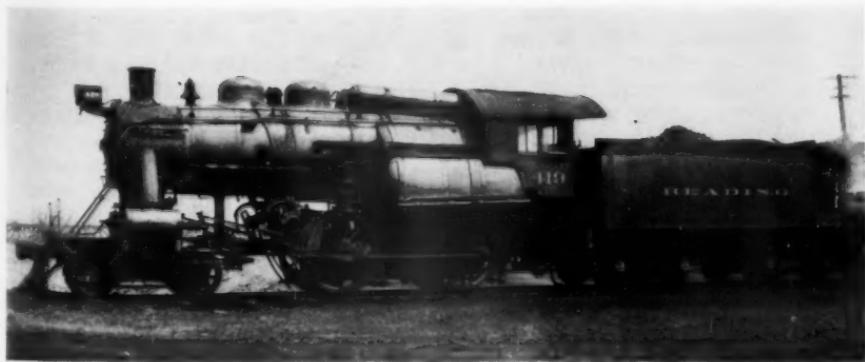
Christening of the Recalling Company

The President's "PRIVATE" Texas & San S. & San S. - Executive Service 30.5.



Courtesy of R. P. Morris

Class M1-sa. Baldwin No. 42675, 1915. At Communipaw, N. J., 1937.
25x32-61½". OD 249700; Total 334425. T. E. 62200#.



Courtesy of John P. Scharle

Class D11s. Bridgeport, Pa., April 18, 1937. Baldwin No. 41217, 1914.
21x24-68½"; OD 120528; Total 173490.

EXPERIMENTAL WORK ON THE CLASP BRAKES

From 1909 to 1912, steel was being used more and more in passenger car construction. In 1906, the Pennsylvania Railroad was officially committed to building passenger cars of all-steel construction from then on. The Reading did not feel ready to make such a drastic move, but closely investigated the combination of wood and steel in the building of their passenger cars. This resulted in the Reading producing a very fine passenger coach which was extremely sturdy and even featured anti-collision details at each end, thereby giving them a degree of safety in some instances surpassing that given by all-steel cars. With the coming of these heavier cars, it became clear that the braking power would have to be arranged to meet the problems brought by such equipment operating at high speed. This problem became so acute that, in the winter of 1912, the Pennsylvania made a series of tests near Absecon, N. J., in an effort to find the best brake gear for heavy, high-speed trains. Here in Elliott's own words is his description of the part played by the Reading in helping the Pennsylvania in this important affair.

"This is a posthumous attempt to give credit to several of those who were responsible for the successful application of the clasp brake to the steel, four-wheel truck, passenger equipment built during the 1900-1915 era. The attempt to brake this equipment with two shoes to a pair of wheels became a serious problem, due to excessive pressure on the shoe.

"Early in July, 1909, the Philadelphia & Reading Railway started work on a composite design of their new passenger equipment, which consisted of a skeleton frame covered with a wooden sheathing. On July 1st, 1909, a special meeting of the Master Car Builders Association on Train Brake and Signal Equipment was held in Pittsburgh to discuss the serious situation confronting the railroads. Among those attending was Thomas L. Burton, of the Westinghouse Air Brake Company, who was also Chief Air Brake Inspector of the P. & R. Ry.

"Shortly before this the Reading had built in their own shops two 72-foot steel underframe baggage cars with six-wheel trucks, to which Mr. Burton had applied clasp brakes of his design. These were such a success that Burton became an advocate of clasp brakes for all passenger equipment. Realizing that the proposed Reading cars would weigh approximately as much as the newer all-steel coaches then in service, he raised the question of braking equipment, at a conference held early in July, 1909.

"Present at this conference were Messrs. Howard D. Taylor, S. M. P., Tom Burton, E. O. Elliott, Chief Draftsman, and Richard Kaucher, leading car draftsman. Burton suggested clasp brakes for the four-wheel trucks, and Elliott remembered that the Pennsylvania Railroad, shortly before 1898, had applied clasp brakes to their newer cars which took the place of their well-known P-f coaches. As Elliott recollects, the pull rod from the brake cylinder was attached to a series of live and dead levers, so connected that all the slack accumulated and had to be taken up at one point; this proving objectionable, it was

thought it might have been the reason this arrangement was not applied to the P-70 steel coaches.

"At this conference it was finally decided that, by using a dead and live lever for each pair of wheels and arranging the upper ends of the live so that they sloped in opposite directions, the pull rods could straddle the center plate and be united at their inner ends by a cross horizontal equalizing lever to which the single pull rod to the brake cylinder would be attached. This arrangement would reduce the slack by one-half, and permit the use of the standard type of hollow brake beam. It became standard on all future Reading steel four-wheel truck passenger equipment.

"The first two cars of this design were exhibited at the Master Car Builders Convention held in Atlantic City, in June, 1910. One was the skeleton steel frame, which showed clearly the brake rigging on both the body and also the trucks. The other was car 1052, entirely completed and ready for service. Its riding and braking were superb. At speeds of 40, 60 and 80 miles per hour, they stopped in approximately two-thirds of the distance required by cars with only one shoe to a wheel.

"For the next two years Tom Burton was, as it were, "a prophet crying in the wilderness." At every mechanical convention, Air Brake Association meeting, etc., he was continually advocating the clasp brake, but apparently with no success. But, early in 1912, Tom got a "Break and his Brake." In February, 1912, there was conducted one of those periodic brake-shoe tests on the West Jersey & Seashore Division of the Pennsylvania R. R. A section of comparatively level track between Egg Harbor and Absecon, about ten miles long, was equipped with all markers for speed recording, and the locomotive, dynamometer car, and train of ten steel coaches were supplied with the necessary recording instruments connected with the track arrangements. Brake shoes of various makes were furnished by their manufacturers."

After these tests were in operation, on a Sunday evening in February, 1912, Elliott, then Chief Draftsman of the Motive Power Department of the Reading Railway, boarded a train in Philadelphia for Reading, where he met Tom Burton, who hailed him as follows, "Say, Elliott, what's that story in the Bible about two men who built houses; one upon the sand, and the storm came and it fell; while the other built his upon a rock and it stood firm?" Elliott repeated the story in more closely Bible text and asked, "But what's the matter, have you been to church today, and did the preacher tell you something you didn't like?" Burton answered, "No, but I have been living among the sand dunes these last few days, at the brake tests between Egg Harbor and Absecon, and they are all wet. The trouble is not with the shoes, but with the brake rigging on the trucks; the pressure is too great; they ought to have clasp brakes. I want you to do me a favor. Be in your office the first thing in the morning; I am going to bring Thomson up (Mr. Samuel G. Thomson, the new S. M. P.) and suggest that he arrange with the management to loan ten Reading coaches equipped with clasp brakes, and test them and compare results so far obtained, and I want you to back me up."

Resuming, Elliott said, "This we did and Mr. Thomson agreed to see what could be done. The cars were loaned, and Mr. Burton arranged that I might witness several of the tests. Now see a quotation from my diary, dated February 21, 1912, 'D. Brake Test Train—P. R. R. between Egg Harbor and Absecon—Engine 3394-K2 (with Schmidt superheater) and 10 P&R steel coaches. Stopping from Emergency in 459 feet at 40 miles per hour, 1075 feet at 60 miles per hour, and 2200 feet at 80 miles per hour, in about two-thirds of the distance it took the P. R. R. trains to stop.'

"Mr. Burton advised me that the P. R. R. cars were side-tracked and the remainder of the tests were made with P. & R. cars. The victory was conclusive; seeing was believing. In the June 14, 1912, issue of the *Railway Age Gazette* is shown a four-wheel motor truck with clasp brakes, for the New York, Westchester & Boston Railway. (At the time, this electric railway's passenger equipment represented the latest in multiple-unit car construction, and use of the clasp brake was a tribute to its sponsors. F. W.)

"However, the *American Engineer*, in its June, 1912, issue, reporting the proceedings of the Annual Meeting of the Air Brake Association, quotes T. L. Burton, of the Westinghouse Air Brake Company, 'Then (Mr. Burton) described verbally the clasp type of foundation brake for heavy passenger cars and presented drawings of such gear as applied to four- and six-wheel trucks on the Philadelphia & Reading. This gear has been in successful use on that road for about two years, and a service of 12,500 miles per brake shoe is obtained. The total leverage is 9 to 1, and, as the usual load on the brake shoe is divided by two, the wear is reduced and there is much less heating of shoes than where only one shoe is used per wheel.' This report was made several months after the tests of February, 1912. *Why in all the mechanical papers is there no mention of the loaning of the Philadelphia & Reading cars to the Pennsylvania Railroad to complete the tests?"*"

In the foregoing, Mr. Elliott has thrown light on an important incident in railroad history. For the 1912 brake tests supplied data essential for conducting the well-known Absecon Brake Tests of 1913, officially recorded by the P. R. R. and the Westinghouse Air Brake Company. The 1913 tests, which clearly demonstrated the effectiveness of the clasp brake, unmistakably vindicated the proselyting tactics of one Tom Burton!

All honor, then, to men like Edward O. Elliott, who gave their best in talent and effort, thereby producing steam locomotives that left their imprint upon railroad operation, and were known and admired the world over for their beauty as well as their performance.

The Cylinder Cars

BY GEORGE ZABRISKIE

A century ago, an ingenious Philadelphian, C. Tiers Myers, watched the little wooden coal jimmies on the railroads. Some had blocks of rubber for springs, others used a stressed ash plank, and many were unsprung. On the Reading, which was just beginning to experiment with an eight wheel hopper car, the couplings were a three link chain and a hook. Other roads used link and pin, but except for these minor differences, the jimmy, a rough, bouncing little four wheel five ton coal car was in nearly universal use by all of the coal roads. Only the Baltimore and Ohio, with the well-known 3 pot hoppers which Ross Winans invented, was not a user of jimmies. With their primitive braking, absence of safety appliances, and frequently crude construction, the jimmies were always dangerous to trainmen; and the cause of many accidents which tied up the railroads.

As Mr. Myers surveyed the situation, the idea for a radically different coal carrier occurred to him. Instead of carrying five tons of coal on four small wheels, why not make the wheels big enough to carry the load on the principle of a lawn roller? Finally, he came up with the car shown in the illustration. It had two five foot cylinders between two six foot wheels. The cylinders had a sheet iron partition in the center to keep their contents from abrasion. That's what Mr. Myers said. He didn't mention that the inner partition also helped to keep the load from shifting into an eccentric weight which would kink the rails and land the car in the ditch. In the drawing, the partition is indicated by the dotted line on the right cylinder, which has its loading doors open. That long lever across the car operated the brake, which was simply a shaped wooden block jammed between the wheels. From the drawing, it can be seen that the car had no springs. It had no axles either, the stubs of journals being riveted to the ends of the cylinders. However, the inventor noted that in case a railroad wanted to put a platform on top of the cylinders, to make the car carry a double load, axles would be necessary.

Just what happened when the cylinders arrived for loading or unloading with the door of one on top and the other on the bottom, Mr. Myers didn't say. But sooner or later, curvature in the tracks and irregularity in the rails would bring about that unhappy result. Since each cylinder carried over two tons of coal (the car was meant to carry as much as a jimmy) it's easy to imagine what fun it would be to jack up those six foot wheels and get them back in line.

Mr. Myers tried his invention on the eastern roads, the RAILROAD JOURNAL of Henry Varnum Poor, and COLBURN'S RAILWAY ADVOCATE. The railroad papers had nothing to say about the car. The railroad mechanical officials were unimpressed. Even the Erie, which seemed ideal for cylinder cars, with its six foot gauge, failed to order one from Mr. Myers.

So the frustrated but energetic inventor, anticipating Horace Greely's later advice about going west, turned his attention to Cincinnati. Cincinnati, with railroads being built to it, running to it, and projected to it, occupied the position Chicago was to enjoy twenty years later. And in 1854 it had the RAILROAD RECORD, one of the first railroad periodicals of the west. The editors of the RAILROAD RECORD, perhaps for a fee, were more than sympathetic toward Mr. Myers: they published a cut of his car, and these warming words of praise:

"This is unquestionably a valuable invention, and worthy of the serious consideration of railroad and coal companies. It possesses numerous advantages over the ordinary freight car, especially for the transportation of heavy bulk freight, such as coal, lime, bacon sides, grain &c; while, as a gravel car in the ballasting of roads, it can have no equal.

"In addition to the advantages in carrying freight, it has the peculiarity of *benefiting* instead of *injuring* the road traveled over. As the load lies immediately upon the rails, all that beating of the wheels, and swaying to and fro of the ordinary car, is avoided, and the steady, uniform motion of the cylinders acts like a roller to press the track solid and even. All moving or abrasion of the load within the cylinders, at slow speed, is obviated by the center piece, while the centrifugal force will of itself prevent any movement at a speed of 8 to 10 miles per hour, as has been fully demonstrated by actual experiment.

"As a matter of economy, if for no other purpose, it should be adopted. Being perfectly in accordance with the natural laws of motion, it requires much less comparative force for its propulsion, and an ordinary engine can take a much larger number than of any other kind of cars: having no weight, except the frame-work, upon the journals, there can be little if any friction, consequently less tractive power is needed for propulsion, and less oil for lubrication, no small item by the way. In the matter of wastage of coal, grain, or other loose freight, it far surpasses all other modes of transportation, as but little or none can escape, nor does it bruise or injure freight, such as coal, grain, &c, as the size of the wheel rim obviates all jar. The wastage on coal will not exceed one per cent, while on the ordinary car it reaches fully five per cent.

"We learn from Mr. Myers that Mr. Dudley of the Frankfort and Lexington Railroad Company, has secured one of them for the purposes of giving it a trial. We should be pleased to hear that numbers of our roads had done the same. The principle strikes us as being nearly perfect: and we should like to see it fully tested; the cost of a car cannot be very great, while the benefits resulting from favorable results upon trial would be incalculable."

For many months afterwards, the RAILROAD RECORD carried an advertisement of MYERS' NEW PATENT CAR, but despite, or perhaps because of, the one Mr. Dudley put in service, the railroads were unimpressed.

Late in 1855 the Southwestern Car Works, of Madison, Indiana, announced that it was the Western Agent for Myers' Patent Car, and

was prepared to build any number for interested parties. But the stubborn railroads continued to let ordinary four and eight wheel cars tear up their roadbeds instead of having the permanent way benefited by the gentle pressure of these improved roadbed impacters. Gradually, Mr. Myers and his invention dropped from sight.

However, the oil boom in Western Pennsylvania brought his idea into prominence again. In 1864 The Howard Oil Tanking and Transportation Co. was organized with the intention of building a fleet of cylinder cars to transport petroleum over the tracks of the Pennsylvania Railroad. After considerable deliberation, Enoch Lewis, then superintendent, recommended to J. Edgar Thomson that they be given permission to operate a fleet of twenty five cars, to be built and maintained at their own expense. The first car appeared on the rails in 1865, and presumably it was the last. This appears to be the only cylinder car of which there is any extant photographic record, but the print, in the galley of an unpublished book, J. Elfreth Watkins, *HISTORY OF THE PENNSYLVANIA R. R. (1896)* is not suitable for reproduction.

Then, one day in March 1879, at 26 Henry Street, Chicago, another inventor put on exhibit a new kind of railroad car—another cylinder car. Mr. Prosser, whose first name has since been lost, was the inventor of this promising vehicle, but from the picture it looks as if he had waited for Mr. Myers' patent rights to expire before he did any inventing. Unlike his predecessor, Mr. Prosser realized that any twin-cylinder car, as he called it, was a splendid device for converting lump coal to coal dust, so he outlined its advantages for the transportation of grain—or rather, a writer for the *RAILWAY AGE*, then a budding magazine destined to merge with the older *RAILWAY GAZETTE*, did it for him.

“The following advantages are claimed by Mr. Prosser, the inventor:

“First. The car is cheaper than the ordinary freight car. This statement, however, we may add, has not yet been demonstrated.

“Second. It is lighter—it is claimed by thirty three per cent.

“Third. It is more durable, on account of the form of construction, combining the greatest possible strength and capacity with the least amount of material.

“Fourth. It occupies less space on the track and is less in height. The ordinary car is from 30 to 35 feet long and from 10 to 12 feet high, while the twin cylinder car is 14 feet long and 7 feet high.

“Fifth. It is of easier draft, so that one engine can draw double the tonnage.

“Sixth. It will not laminate the tracks, on account of the large circumference of the rolling surface, and elasticity of its hollow cylindrical form.

“Seventh. It may be safely run at a higher speed without damage to the tracks.

“Eighth. It lowers the center of gravity, giving greater stability and adhesion to the track.

"Ninth. It reduces the windage of the train, its side area being only about one third that of the ordinary car.

"Tenth. It removes the weight of the load from the axle, and arranges it so as to roll directly upon the track. Rolling friction is said to be only about one seventh as much as the friction of the axle.

"Eleventh. It requires less oil, less attention, and a less number of parts. The only oil required is the slight amount upon the draft trunnion.

"Twelfth. It can dry wet grain in the car while in transit, the air being allowed to circulate through perforations, thus also preventing heating.

"Thirteenth. It is indestructible by fire."

Mr. Prosser's car, as can be seen, had a deck over the cylinders, which were a full six feet in diameter, with iron tires on them. Although it was supposed to be loaded and unloaded through openings in the ends of the cylinders, two trap doors show plainly on top of the platform. Having grain trickle out on the tires when the car was unloaded might annoy some shippers, but perhaps Mr. Prosser thought of an unloading trestle to appease them. The car was supplied with two hand brakes, but the drawing gives no clue of how they operated.

In August THE NATIONAL CAR BUILDER, a New York publication, printed a slightly different drawing of the Prosser car, and noted that the first car was sent out on the 17th of June on the Chicago and Pacific road to Byron, Illinois, making a round trip of nearly 200 miles. THE NATIONAL CAR BUILDER was more skeptical in its tone than THE RAILWAY AGE as it commented: "If no injury results to the freight, whether it is corn, wheat, or anything else that can be rolled in this way, and if there are no mechanical or other drawbacks to neutralize the many obvious advantages of the plan, then it must be conceded that this style of car is a success as well as a novelty."

1879 was the golden year for cylinder cars. In November, George E. Sly of Belle Plaine, Minnesota obtained Patent No. 221,871 on another cylinder car design. Sly's cylinder car seems to offer radical departure from the others, judging from the patent model which is now on exhibit in the National Museum, Washington, D. C. Like the Prosser car, Sly's had a central brakewheel, but the model gives no indication of how it worked. Unlike all the other cylinder cars, it had truss rods which utilized the center line of the journals as queen posts, and it is probable that this single feature was used as the basis of the patent.

By 1880 the cylinder car fallacy seems to have died. The design violated so many engineering principles that nearly every "advantage" its proponents claimed would be negated in actual practice. Anyone who wants to take a modern water filled, hand-drawn lawn roller and run down the street with it will receive a positive demonstration of the limitations of the cylinder car. However, the lawn roller does compress the lawn, while the cylinder cars, with loads which tended to act as

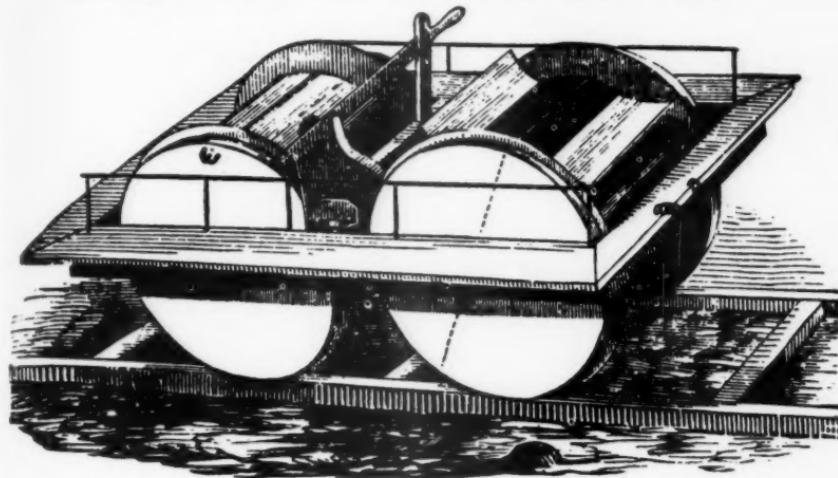
eccentrics and with a nosing effect produced by the short wheelbase did not "benefit the roadbed."

Looking back, the persistence of the idea and the variety of its supporters seems almost incredible. The first version of Myers' car should have disproved the theory, but like the unreasonable multiplication of mechanical effort which was behind the Fontaine Locomotive and the Holman device, the theoretical advantages were so great that both inventors and investors were quite unwilling to overlook the practical disadvantages.

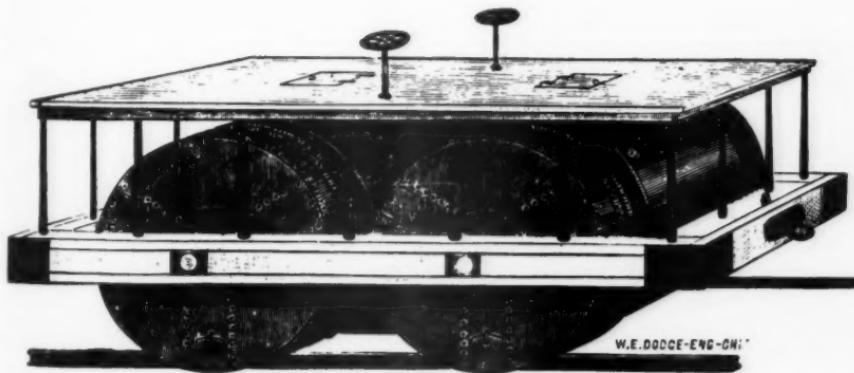
The nineteenth century saw many such attempts to change the realities of physical facts by wishful thinking and favorable publicity, but the cylinder cars were unique in the persistence of their supporters and the duration of time in which the idea continued to reappear.

RAILROAD RECORD

MYERS' NEW PATENT FREIGHT CAR



Myers' New Patent Freight Car.



"PROSSER'S TWIN CYLINDER CAR."

Prosser's Twin Cylinder Car.





T. St. L. & W. No. 37, Rhode Island 1889, on the morning Frankfort-Toledo local.



T. St. L. & W. No. 44, Brooks, 1904.



T. St. L. & W. No. 19, Rhode Island, 1887.



T. St. L. & W. No. 33, Rhode Island, 1887.

The "Clover Leaf"

BY CHARLES E. FISHER

Of the many railroads that entered Toledo, Ohio, years ago, was the Toledo, St. Louis & Western, known as the "Clover Leaf." Stretching in a south-westerly direction across the fertile states of Ohio and Indiana, it formed one of the most direct routes between Toledo and St. Louis—a distance of some 450 miles. It was while the author was stationed at Toledo one summer and fall that there passed the Jennison-Wright plant the early morning train from Frankfort, drawn by a Rhode Island-built locomotive and followed by three cars.

The "Clover Leaf" dates back to 1870 when the Frankfort & Kokomo R. R. was formed to complete the abandoned Evansville, Crawfordsville, Frankfort, Kokomo & Ft. Wayne R. R., between Frankfort and Kokomo. The line was placed in operation on July 4, 1875 and, on May 21, 1881, it was consolidated with the Toledo, Cincinnati & St. Louis R. R. The latter was originally built to standard gauge and was later rebuilt to narrow gauge.

The Toledo & Maumee Narrow Gauge R. R. was incorporated in 1873 to build a line between Toledo and Maumee and the road was completed on March 10, 1874. The little engine and train made six round trips daily over this nine mile line. In 1877, this road leased at a daily rental the Toledo & Grand Rapids R. R., a six mile line extending from Maumee to Waterville.

The Toledo, Delphos & Indianapolis, incorporated in 1872 to build a railroad from Toledo to the Ohio-Indiana state line, had completed 16 miles of narrow gauge road by 1879 between Dupont and Delphos and later in the year a six mile extension was built to connect with the Delphos, Bluffton & Frankfort R. R. at Willshire, Ohio.

On April 21, 1879, the Delphos & Kokomo; the Toledo, Delphos & Indianapolis; the Delphos, Bluffton & Frankfort and the Toledo & Maumee Narrow Gauges railroads were consolidated to form the Toledo, Delphos & Burlington R. R., an eighty-eight mile narrow gauge line with a 17 mile gap between Holgate and Grand Rapids, Ohio. Poor's Manual for 1880 shows this road as extending from Toledo, Ohio to Kokomo, Ind., 185 miles with a branch from Delphos to Dayton, Ohio, 100 miles but, only 121 miles in actual operation. Connections at Dayton were made with the Dayton & South Eastern Narrow Gauge R. R., thus securing a connection for Cincinnati. The D. & S. E. was incorporated in 1871 to build a railroad between Dayton and Gallipolis, Ohio and, by 1881, 124 miles of line had been built from Dayton to Wellston, Ohio. On Feb. 24, 1881, the road was consolidated with the T. D. & B. and the latter, when completed was to have 1500 miles of narrow gauge railroad, the longest narrow gauge railroad in the world.

In the meantime the Toledo, Cincinnati & St. Louis, successor to the T. D. & B. had acquired other railroad properties but, in 1883 it went into the hands of Edwin D. Dwight, Receiver. The 781 mile railroad was broken up and three new companies were formed by Sylvester H.

Kneeland, their purchaser—the Toledo, Dupont & Western, incorporated in Ohio containing the Ohio properties, 100 miles; the Bluffton, Kokomo & Southwestern in Indiana containing the Indiana properties, 171 miles and the Toledo, Charleston & St. Louis, incorporated in Illinois containing the property in that state, 178 miles. These three companies on June 12, 1886 were consolidated to form the Toledo, St. Louis & Kansas City R. R.

With new money in the till, Kneeland wisely embarked on the project of making the road standard gauge and furnishing it with new rolling stock. With all trains in their terminals on Saturday night, June 25, 1887, the order to change over was given and the 4:00 P. M. train from Toledo on June 25th, was the last narrow gauge train to run over the road. By the following Monday, the line between Toledo and Frankfort was standard gauge. It was about this time the name "Clover Leaf" was applied to this road. Whether Toledo, St. Louis & Kansas City was longer to pronounce than Toledo, Delphos & Burlington, the former name for a portion of the new road, at any rate, the new name seems to have originated in Toledo and, it was hoped (?) the road would "live in clover" for the rest of its days. Under the direction of J. M. Quigley, the road had become a paying proposition and, on September 19, 1887, he was succeeded by S. R. Calloway, General Manager of the Union Pacific R. R. Mr. Calloway directed its affairs until 1895 when he was elected President of the "Nickel Plate."

From May, 1893 to August 1, 1900, the road was in the hands of a Receiver. On the latter date, there emerged the Toledo, St. Louis & Western R. R. that embraced the properties in Ohio and Indiana and the Toledo & East St. Louis R. R., that included the properties in Illinois, the latter was sold to the T. St. L. & W. on July 30, 1900. Benjamin Norton, General Manager of the Ohio Southern succeeded Samuel Hunt, Receiver.

At the time of the organization of the Detroit & Toledo Shore Line R. R., the "Clover Leaf" with the Grand Trunk Ry. acquired one half of the capital stock. The stock is held today by the "Nickel Plate" and the Grand Trunk Western, the United States subsidiary of the Canadian National Rys. In 1907 the "Clover Leaf" purchased stock control of the Chicago & Alton R. R. from the Rock Island interests and, during the receivership of Walter L. Ross, who had been president since 1912, control of the Alton was relinquished. On December 31, 1922, the receivership was lifted and the road came under the control of the Van Sweringen interests and the road is now a part of the "Nickel Plate" Road.

Perhaps the only outstanding passenger train operated by the "Clover Leaf" was the "Commercial Traveler," the overnight train between Toledo and St. Louis. Inaugurated in January, 1901, it was vestibuled throughout, the cars had reclining seats, were lighted by gas and the train was made up of five or six cars including a cafe coach and a sleeping car. Both Ohio and Indiana were in the gas and oil boom days at the time and the train gained plenty of passengers. After the boom days, passenger traffic suffered. The road could not secure enough through passengers in competition with the other roads and had to serve

its own stations. This slowed the service and so, on April 4, 1943, the last passenger train was run on the "Clover Leaf" under "Nickel Plate" management.

Of the narrow gauge rolling stock, very little is known of its disposition. Some of the locomotives are reported as being sold to the Denver & Rio Grande and some to a narrow gauge road in Texas. There is no way to confirm this report as no rosters of these early lines exist. Of the Toledo, St. Louis & Kansas City, the Rhode Island Works seems to have furnished most of its locomotives. Commencing in June, 1887, thirteen engines of the 4-4-0 type, Nos. 11-23 were delivered. All had 17x24" cylinders and 62" drivers except Nos. 11-12 which had 68" drivers. Two moguls, Nos. 30-31, 18x24" 54" were delivered in December, 1888, followed by Nos. 32-34 in January, 1889. Three ten-wheelers, Nos. 27-29, 18x24" 55", built in 1888 for the Macon Construction Co. were diverted to this road and delivered, probably in 1889. Ten more of the same type and dimensions, Nos. 35-44 were delivered the first two months of 1889 and Nos. 45-50 followed in 1890. In 1891, Nos. 51-54 were delivered, followed by Nos. 55-60 in June of that year. Nos. 61-70, like the other ten-wheelers came in 1892 and, in 1893, Nos. 71-75, 4-6-0 with 19x24" cylinders, 56" drivers and two 0-6-0 switchers, 18x24" 50" were delivered in 1893. These Rhode Island locomotives performed most of the work on the road for nearly the next decade and were cared for at the Frankfort Shops.

From the Dickson Works of the American Locomotive Co., Nos. 5 and 6, two six wheeled switchers, 19x26" 50" were delivered in 1902. Two 2-8-0's, Nos. 132-133, 20x26" 56" came from the Schenectady plant in 1904. Nos. 44-45, two "Atlantics" came from the Brooks plant in 1904, 19x26" 73" 150000# weight of locomotive. Nos. 150-159, 4-6-0 type, 19½x30" 63" 167000# came from the Schenectady Works in 1904 to be followed in 1905 by Nos. 160-174, 21x28" 57" 189000# from the Brooks Works, 2-8-0 type. Later in the same year, Brooks furnished Nos. 175-189, identical to the others but slightly heavier. The last order from the American Locomotive Co. came from the Brooks Works in 1907 for Nos. 7-12, 0-6-0, 19x26" 51" 132000#.

From the Baldwin Works Nos. 40-43, 4-6-0 type, 19x24" 68" came in 1901 to be followed by Nos. 120-125, 2-6-0 type, 19½x26" 62" that same year. Nos. 130-131, 2-8-0 type, 20x26" 56" were delivered early in 1902 and in 1907, Nos. 126-127, 2-6-0 type 20x26" 63" arrived. Nos. 190-194, 2-8-0 type, 22x28" 57" were delivered early in 1913 and these were followed by two six wheeled switchers in 1921, Nos. 16-17, data not given in the records.

From the Lima Locomotive Works came three groups of consolidation type locomotives: Nos. 201-205 in 1916, 22x28" 57" 200500#; Nos. 206-210 like the others save the weight was 209000# arriving in 1921 and Nos. 211-216 delivered in 1922 similar to the last five locomotives.

Save for the #37, on the early morning local, as I used to see it as she passed the Jennison-Wright Plant, all of the illustrations are from the Grigg collection. Thus, from one of the largest narrow gauge lines in the mid-west, the road is now an important part of the "Nickel Plate" and serves to bring that road directly into the St. Louis area.

Worth Reading

compiled by

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BOOKS AND PAMPHLETS

L'Année Ferroviaire 1957. iv, 236 p., illus., diagrs. Paris, France, 6e, Librairie Plon, 8 rue Garancière; New York 20, N. Y., French National Railroads. Price not stated. ". . . This year's edition carries out not only the usual information about our own accomplishments and plans [for 1957-1961] but also includes more articles devoted to railroading in other countries than in previous years." *La Traction A Vapeur* pp. 148-149 with diagrams of 2 Mikados and a Mountain, types. *La Traction Electrique* pp. 150-162. Diagrams. *La Traction A Moteurs Thermiques* pp. 162-170. Diagrams.

B & O Directory—Coal Mines and Coke Ovens Located On or Accessible To The Baltimore & Ohio Railroad 1957. 104 p. illus. Folded Map. Baltimore 1, Maryland, Baltimore & Ohio Railroad Co. Free on request.

British Railways In Action, by O. S. Nock. 228 p. illus. London, New York [etc.], Thomas Nelson & Sons Ltd. 25 shillings.

Canada. Department of Transport. Annual Report for the fiscal year ended March 31, 1956. 109 p. Ottawa, Canada, Queen's Printer, Edmond Cloutier. 50 cents.

A Concept of Agribusiness, by John H. Davis and Ray A. Goldberg. xiv, 136 p. illus., folded tables. Boston, Mass., Harvard Univ. Graduate School of Business Administration. \$6.00. ". . . There is a two-way interdependence between businessmen and farmers in the dual roles of suppliers and purchasers. This interdependence is so close that the authors have coined a new word 'Agribusiness,' to describe the interrelated functions of agriculture and business."

Doctors, Dynamite and Dogs, by Edith M. Schussler. 189 p. illus., end-paper maps of the sections of Idaho and Montana thru which the Chicago, Milwaukee, St. Paul and Puget Sound Ry. was built between St. Regis, Montana and St. Joe, Idaho in 1907-1909. Caldwell, Idaho, The Caxton Printers, Ltd. \$5.00. "Taft Hospital" photograph facing p. 21.

East African Railways and Harbours, Nairobi, Kenya Colony, Africa. Annual Report for the year ending December 31, 1956. 64 p., illus., map.

Feasibility of Atomic Energy for Use on American Railroads. Report No. MC-280, by Association of American Railroads Research Center. iii, 102 p., illus. Chicago 16, Ill., AAR Research Center, 3140 South Federal Street. No price given.

Fiberglas Is Working on the Railroad. 53 p., illus. Toledo 1, Ohio, Owens-Corning Fiberglas Corp., 642 National Bank Bldg.

5 Minute Safety Talks for Railroad Supervisors and Foremen. 26 talks, unpaged. Chicago 1, Illinois, The National Safety Council. No price given.

"Full Throttle" . . . A Tribute to the Fast Growing South. [20]-page, illus. brochure. Louisville, Ky., Louisville & Nashville Railroad Co.

Great Britain. Central Transport Consultative Committee. [8th] Annual Report for the year ended 31st December, 1956. . . . to the Minister of Transport. London, Eng. H. M. Stationery Office, 9 pence; New York 20, N. Y., British Information Services. 12 cents.

India. Ministry of Railways—Report by the Railway Board . . . for 1955-56. Volume 1. New Delhi, India, Manager of Publications. ". . . The Year was the last year of the First Five Year Plan and witnessed an acceleration of economic activities. . . ."

International Railway Statistics, Year 1955—English Edition. 167 p. Paris, 17, France, Union Internationale des Chemins de Fer. No price stated. Include "a large number of Non-Member Administrations which are grouped together at the end of each Table. . . . The dates of the beginning and end of the working year, when they are not 1st January and 31st December, are shown in column 2 of each table under the name of the Administration concerned." Foreword p. [2].

International Railways of Central America. Annual Report 1956. 16 p. folded map of lines in El Salvador and Guatemala. Jersey City 2, N. J. [The Company], 15 Exchange Place.

Kundebetjening og Trafikkerhvervelse [Handbook of Sales Promotion by railroaders]. Cover-title, 104 p., illus. Copenhagen K, Denmark, Danske Statsbaner, Solvgade 2. Free on request.

Management for Growth—From the 1956 Transportation Management Program, edited by Gayton E. Germane. xiii, 126 p. Stanford, California, Stanford University Graduate School of Business, \$4.75. Includes: *The Need for Executive Training*, by Donald J. Russell, pres., Southern Pacific; *Management Reorganization*, by Laurence T. Mayher, Robert Heller & Associates. ". . . the case of one company, The Pennsylvania Railroad . . ." Folded charts and map: *The Nine Regions*; *Emergency Transportation Controls*, by Maj. Gen. Paul F. Yount, chief of transportation, U. S. Army. Charts; *Revising National Transportation Policy*, by George F. Baker, pres., Transportation Association of America and James J. Hill, Professor of Transportation, Harvard University.

New South Wales. Department of Railways. Report of the Commissioner for Railways for the year ended 30th June 1956. 92 p. illus., folded map. Sydney, N. S. W., A. H. Pettifer, govt. printer.

New South Wales. Report of the Commissioner for Motor Transport for the year ended 30th June, 1956. 30 p. folded map. Sydney, N. S. W., A. H. Pettifer, govt. printer. 6 shillings sixpence.

Pakistan. Ministry of Communications (Railway Division). Report on Pakistan Railways (excluding Junagadh State Railway) for 1951-52. 104 p.; . . . for the year ended March 31, 1953. xvi, 97 p., 1957. Karachi, Pakistan, Manager of Publications, 1957. For prices in U. S. money write The Ambassador of Pakistan, 2201 R St., N. W., Washington 8, D. C.

Pennsylvania Railroad Harbor Facilities—Port of Philadelphia. 14 p., illus. map. Free on request to Pennsylvania Railroad Co., Suburban Station, Philadelphia 4, Pa.

Pennsylvania Railroad Policy. (In its 110th Annual Report for the year ended December 31, 1956, pp. 4-21. Illus. part in color, map). Reprinted. 31 p. Philadelphia 4, Pa. The Pennsylvania Railroad Co., Transportation Center, 6 Penn Center Plaza. 1957. Free on request.

A Picture History of Railways, by C. Hamilton Ellis. 18 p., 408 illustrations. Index to both. New York, The Macmillan Co. \$5.95.

A Railroad Policy for New England. A report by New England Governors' Committee on Public Transportation to the New England Governors' Conference, March 1957. 75 pp. Free on request to the Conference, 1137 Statler Bldg., Boston 16, Mass.

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de datos base para la información estadística y cálculo de los precios de coste, by Fernando Oliveros Rives; Organización de la oficinas comerciales de los ferrocarriles, estudiando con especial atención los problemas del mercado de transporte y los métodos empleados para promover el aumento del tráfico, by Victor Bulto; La organización en general de los ferrocarriles, considerando con especial atención: la simplificación del trabajo;—las cuestiones del personal; y el cálculo de precios de coste, by Carlos De Inza. [2 vols.]; Organización y funcionamiento de la Contabilidad, Tesorería, y Finanzas, by Jesús de la Fuente.

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Switzerland. Chemins de Fer Fédéraux Suisses. Rapport et propositions du Conseil d'Administration des Chemins de Fer Fédéraux Suisses au Conseil Fédéral, a l'appui du rapport de la Direction Générale sur la gestion et les comptes de 1956 (du 23 avril 1957). vi, 102 p., illus. Berne, Switzerland, Seerétaire des CFF.

Terminología Ferroviaria Americana—Proyecto en Estudio—1956. 5 chapters. Buenos Aires, Argentina, Asociación del Congreso Panamericano de Ferrocarriles. No price stated. Will be presented to Pan American Railway Congress, Aug. 30-Sept. 13, 1957. Ch. I—Via y Obra; II—Tracción y Material Rodante; III—Trafico y Explotación; IV—Contabilidad y Estadística; V—Personal.

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Timed Trains, by L. K. Sillecox. 14 proc. 1. New York 17, N. Y., The New York Air Brake Co. Free on request. ". . . Man is able to make a great many wonderful and intricate things—both for enhancing life and for destroying it—but one he is unable to make is *time*. Railways serve to save time in the orderly handling of commerce. . ." (p.7). ". . . The key feature to an improvement in railway freight service and earnings is that of requiring Traffic officers to be held accountable for costs of service requirements. 1—By declaring in advance what tonnage they plan to secure; 2—By specifying the timing of trains they require or the timetable performance necessary to hold such traffic; and 3—Finally by holding them accountable for actually obtaining such traffic and if exceeded to see that it is not delayed. On the other hand if promises are not met they should agree to remove the trains that do not pay their way . . ." (p. 8-9)

TRAINS—Electronic Age Edition, By Robert Selph Henry. 152 p., illus. end-papers; *A Century of Railroads in America*. New York, Indianapolis, The Bobbs-Merrill Co., Inc. c1957. \$3.75. Ch.XVIII. *Electronics on the Rails*. Appendix: *Freight Car Initials*, [Canadian, Mexican, U. S.]

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Water Transportation Policy for New England—Report No. 8—May 1957. 53 p. Boston 16, Mass., 1137 Statler Bldg., New England Governors' Committee on Public Transportation. No price given.

Where Do We Go From Here? by John W. Berriger, president, Pittsburgh & Lake Erie Railroad Co. 13 mimeo. 1 Pittsburgh, Pa. P. & L. E. Ry. President's Office. Free on request. Address to American Society of Mechanical Engineers, Erie, Pa., March 20, 1957.

ARTICLES IN PERIODICALS

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Are the Railways Finished? A User's Question, by L. G. Burleigh. *Modern Transport*, May 5, 1957, p. 11. Comment to Irish Section, Institute of Transport.

Avec le Mistral à 160 km/h Aux Essais de Vitesse en Vue de l'Horaire Paris-Lyon: 4 Heures, by G. Force, la vie du rail no. 598, 26 mai 1957, pp. 6-7. Illus. Cartoon showing 2 cows' reaction, "Paris-Lyon en quatre heures" p. 34.

Baltimore & Ohio Magazine Anniversary Salute! 10th Anniversary—B & O Sentinel Service—20 Anniversary—B & O Stewardess Service. May 1957 issue. Illus.

A Better Deal for Commuters, by George Alpert. *Harper's Magazine*, April 1957, pp. 30-33. The president of the New Haven proposes a plan.

A Brief Report on the McGill Coal Burning Gas Turbine Project, by D. L. Mordell. *The Engineering Journal, Canada*, April 1957, pp. 404-408. Illus., Diags.

The Channel Tunnel—A Model of the Design by the French Engineer, M. Basdevant, For A Channel Tunnel Which Would Incorporate Road and Rail Tracks, Ventilation and Drainage Tunnels. The illustrated *London News*, May 4, 1957, p. 724.

China Choo-Choo—Red Railroads Multiply; engine designers and drivers become heroes—but there's still a freight and passenger jam-up; Industry seriously hobbled, by Guy Searle. *Wall Street Journal*, June 13, 1957, pp. 1, 12. Map: China's new rail arteries, p. 12, shows "new railroad;" "railroads under construction;" "railroads to be built soon;" "older railroad." This dispatch from Hong Kong also mentions first locomotive in China designed and constructed by Chinese.

Danny Diesel and the Chug-a-lug Choo Choo, by Donald Anderson. Grade Teacher, March 1957, pp. 17, 76-77. Cartoon by Bob Jones. On the Rollicking Railroad.

Dernier né de la cavalerie S. N. C. F.—le [tutorial] 825 ch “tous services” by Michel François. la vie du rail no. 598, 26 May 1957, front cover and pp. 3-4. Illus., plans, and table: *Quelques caractéristiques techniques du 825 CH.*

Design, Development and Performance of Alco Model 251 Engine, by Stanley E. Lodge. The Southeastern Railway Diesel Club. Official Proceedings. . . Dec. 11, 1956, pp. 9-17. Club's secretary: H. E. Brewer, P. O. Box 6351, Jacksonville, Florida.

Dual-Powered High-Speed Locomotives, by Robert Aldag and F. L. Sahlmann. Mechanical Engineering, April 1957, pp. 341-344. Diagrams. "... New Haven now operating two units on new lightweight passenger train."

Free-piston Engines and Compressors—A Bibliography, by J. A. Scanlan and B. H. Jennings. Mechanical Engineering, April 1957, pp. 339-340, 355.

French Experience with Free-Piston Engines, by M. E. Barthalon and H. Horgen. Mechanical Engineering, April 1957, pp. 428-431. Illus., Diags.

Have You Seen These 1957 Models? Locomotive Showroom. Trains, May 1957, pp. 16-25. Photographs of Electro-Motive—Alco Products—Fairbanks-Morse and General Electric locomotives.

... *The Jenner Road Tunnel, Le Havre, France. . . An automatic device in the translucent canopies counts the traffic by kinds, four-wheeled—two-wheeled and pedestrian. Illustrated London News, May 4, 1957, p. 724.*

Joe Fisher's Neighborly Railroad, by Luther Miller. Railway Progress, June 1957, pp. 16-22. Illus. "The golden rule is a front office law on the Reading. . . ."

Liason air-fer par hélicoptère on montagne.—S. N. C. F. trains from Paris to Val d'Isère, helicopter from Val D'Isère to Bourg St. Maurice and return. la vie du rail no. 599, 7 juin 1957, back cover. Illus. and map in colors.

Locomotive Manufacture in Australia. Diesel Railway Traction, April 1957, pp. 141-142. "... Some notes on the work of Clyde Engineering, a company associated with General Motors and Maybach Motorenbau."

Mechanization of Track and Maintenance, by H. C. Fox, process engineer, Southern Ry. System, Atlanta, Ga. Railway Club of Pittsburgh. Official Proceedings . . . March 1957, pp. 26-30. Discussion pp. 30-34. 25 cents. Club Secretary's office, 2710 Koppers Bldg., Pittsburgh 192, Pa.

14. *Military Aspects of Railroading*, by Thomas E. Sams, Colonel, Transportation Corps; Chief, Railway Transportation Div., U. S. Army. Southeastern Railway Diesel Club. Official Proceedings. . . February 1957, pp. 9-22. Discussion pp. 22-29. Club's secretary: H. E. Brewer, P. O. Box 6351, Jacksonville, Florida. ". . . The mission of the Chief

of Transportation is to direct, coordinate and supervise all transportation functions for the Department of the Army and to provide transportation service and assistance to the Departments of the Air Force and Navy. . . . we limit ourselves at this time to discussion of the phase of the mission which deals solely with railway operation by the Military in times of peace or war. . . . " (p. 9). ". . . We must not forget there are some 783,679 miles of railways in the world. This requires us to develop, or plan for possible development, motive power and rolling stock which will be adaptable for operation in the seven principal gages of the world. . . . we have separated our motive power and rolling stock into two gage groupings . . . narrow gage . . . broad gage. We have further separated our motive power and railway rolling stock into two classifications namely, foreign and domestic service. Our domestic service locomotives and rolling stock are designed to conform to AAR and ICC requirements and are intended primarily for use in posts, camps, and stations within the United States. . . . Our broad gage foreign service locomotives, while operable in the United States, are generally more restricted in size by foreign clearance limitations. You possibly are wondering just how we propose to accomplish change of gage. This has been accomplished by the development of a multi-gage truck. . . ." (pp. 15, 17)

The Modern Missouri Pacific . . . \$375 Million Rebirth. Modern Railroads, April 1957, pp. 73-216. Maps, illus., Diagrs.

Modernization in Railroading—Motive Power—Today . . . Tomorrow? The Gas Turbine engine? . . . the Free Piston engine? . . . the Atomic locomotive?—Right-of-Way—Rolling Stock—Railroad Research, Oil-Power, Vol. [19] 57—No. 2. Illus.

Negroes in the Railroad Industry. Ebony, April 1957, pp. 34-38. Illus.

New Haven Tests Three Lightweights—[the John Quincy Adams, the Dan'l. Webster, and the Roger Williams], low cost, low-slung passenger trains. Modern Railroads, June 1957, pp. 75-80. Illus. and tables.

New Horizons for the DF Car—“Special Purpose” is rapidly becoming a misnomer for such equipment. Modern Railroads, June 1957, pp. 117-118, 120, 122. Illus. include “Steel coil car.”

Ninth Annual Motive Power Survey—A Revolution Comes (almost) Full Cycle, by David Morgan. Trains, May 1957, pp. 53-57. Illus.

1000 Items A Minute! Southern's data processing machine gobbles up mountains of railroad paperwork. Modern Railroads, June 1957, pp. 127-128, 130, 132, 134. Floor plan and illus. “Accounting, payroll processing, pension records, financial calculations are a few of the many applications the machine has in Southern's computer center [in Atlanta, Ga.]” “Memory unit” holds 3000 instructions” (pp. 128 and 124).

One Yard Replaces Eight—NYC's new Frontier Yard will serve busy Buffalo area, cut \$4.5 million from annual yard expense, by Tom Shedd. Modern Railroads, May 1957, pp. 78-79, 81-82. Map, plan, illus. “. . . NYC is also rapidly building two other push-button yards . . . at Elkhart, Ind. . . Youngstown, Ohio . . . Further steps in the

railroad's yard program will depend in part on the results of an operations-research study, now being made . . . by the Carnegie Institute of Technology. . . ."

Peculiarities of Railroad Accounting, by Peter Kocan. The Analysts Journal, May 1957, pp. 85-90. " . . . What are these ICC accounting principles that differ so much from generally accepted accounting principles that some public accounting firms amend their certificates accordingly? . . ."

Pennsylvania Railroad Motive Power Roster compiled by Sy Reich. RAILROAD Magazine, August 1956, pp. 36-37, 55-59. Dated Jan. 1, 1957. Illus.

Petroleum Products for the Railroads. Oil-Power, 1957, no. 2, pp. 14-15. "Railroads use a number of petroleum products common to other industries. . . . However, modern railroading requires a number of specialized petroleum products. . . ."

Prime Mover. The Washington, D. C. Daily News, May 31, 1957, p. 31. Photograph with caption: "A sign on these trucks says 'Moss Moves Anything.' In this case its 'Tweetsie,' a narrow-gauge train being hauled from Hickory, N. C., to Blowing Rock, N. C. to be a tourist attraction."

Railroad Research and Development, by Douglas C. Turnbull, vice-president of Research and Development, B. & O Railway Club of Pittsburgh. Official Proceedings . . . April 1957, pp. 28-29. Summary.

Railroad Youth Movements; Accounting Department Fuses Youth with Experience Level as Its Advance into Electronic Computers. Modern Railroads [Editorial], June 1957, p. 71.

Railroading . . . as they see it. Trains, June 1957, pp. 28-35. Illustrated with photographs of steam locomotives " . . . since the era of the 'Russian Decapod' . . ."

Saint-Gobain—La Manufacture de Glaces et Son Chemin de Fer. la vie du rail, no. 599, June 2, 1957, pp. 3-11. Illus. include pictures of locomotives and "Tableau de la Charge des Trains—Chemins de Fer de Chauny à Saint-Germain."

Salt Lake Fill [on Great Salt Lake by Southern Pacific—a four-year project]. RAILROAD Magazine, August 1957, pp. 18-19. Map and illustrations.

Seaboard Builds Central Wheel Shop. Modern Railroads, May 1957, pp. 87-89, 91-92, 94. Illus. "Built 'from Scratch,' new shop at Hamlet, N. C., is an 'engineer's dream.'"

The Second Transport Revolution, by Marvin J. Barloon. Harper's magazine, March 1957, pp. 37-43. Drawings by Helen Borten. Comments: Railway Age [Ed]: Can you pull the pin on pessimists? March 18, 1957, p. 58; W. A. Grotz, president, Western Maryland Ry. in New York Railroad Club. Official Proceedings . . . March 21, 1957, pp. 98-101: " . . . Its author, M. J. Barloon, is professor of economics at Western Reserve University and a transportation consultant. While he undoubtedly overpaints the picture, his statement that it is not unreasonable to expect the highways, waterways, and pipelines, to be carrying some 70 to 75 percent of the nation's traffic by 1975 sharply

raises two questions: What is happening to the railroads? . . . What can be done about it? In the first place, I disagree with the professor. But it seems to me that the railroads can improve what they are now doing and can profitably step out and work out some new ideas. Railroads everywhere are alert to the problem . . ."

The Solar Engine: An Analysis, by Peter Courvoisier. Mechanical Engineering, April 1957, pp. 445-447. Illus.

Steam . . . at sea level and 6288 feet up . . . Grand Trunk . . . by David P. Morgan. His "Steam In Indian Summer 12." Trains, June 1957, pp. 22-26. Illustrated with photographs by Philip R. Hastings.

STEAM with a European Accent. Railway Progress, June 1957, pp. 24-29. Illustrated with photographs of steam locomotives in service in Great Britain including Isle of Wight, Danish rys., German Federal Rys., French rys., Italian rys., Norway, Sweden, and Russia.

Tendance de la Traction en U. R. S. S. la vie du rail no. 598. 26 Mai 1957, pp. 10-14; no. 599, 2 juin 1957, pp. 12-15. Illus., diagrs. "L'avenir" (2 juin, pp. 12-13)

Transport in Ireland—Report [by committee, Dr. J. P. Beddy, chm., appointed July 14, 1956, by Eireann Ministry for Industry and Commerce] *Suggests Drastic Measures—Railway Mileage Should be More Than Halved*. Modern Transport, May 25, 1957, p. 11. Maps; "Railway System of C.I.E. as it would be left under committee's proposals" and "extent to which C.I.E. had introduced diesel traction. . . ." Ed. comment: "Better Late Than Never" p. 2.

25 Years Service to the Transport Industry. Modern Transport anniversary issue, April 27, 1957 containing articles on transport developments 1932-1957.

Wheels, March-April 1957. Vol. 12, No. 2. "This issue marks the completion of the Twelfth and final year of the publishing of WHEELS."

The World's Fastest Steam Locomotive—Like a Runaway Comet, No. 7002 Wheeled the Pennsylvania Special for three Exciting Miles at 127.1 Miles an Hour, Away Back in June, 1905, and No Regularly Scheduled Train Has Ever Equaled That Record! by Freeman Hubbard. RAILROAD Magazine, August 1957, pp. 30-35. Illus. including sketch of Jerry W. McCarthy, "PRR engineer, the international rail-speed champion" (p. 34). "It happened because of a hot-box. . . The inside story is that of a throttle artist with an extra-good steam locomotive making up time lost by an overheated journal. Just a routine job well done! . . ."

New Books

The South Western Railway, by Hamilton Ellis. 256 pages, 8 $\frac{1}{2}$ x 5 $\frac{1}{2}$. Illustrated. Distributed by The Macmillan Co., 60th Fifth Ave., New York (11), N. Y. Price \$6.75.

The London & South Western Railway, in competition with the Great Western Ry., served the south western portion of England, including the busy port of Southampton. It was the senior company of the British railways and its history was unbroken by consolidation until 1923 when it formed the major portion of the Southern Railway. The author has included a history of the road but his chief concern is the locomotives and rolling stock and the men that built and designed them. The road was fortunate in attracting a number of capable men to manage Nine Elms and their Locomotive Department. The road was a pioneer in automatic signalling. In 1892 the road acquired the Southampton Docks and they proceeded to develop this port until it became all important as a shipping center.

Between 1850 and 1871, Joseph H. Beattie was in charge of the Mechanical Department. During these years, the works at Nine Elms was brought to a high state of development and there was a steady procession of locomotives built in these railroad shops. From 1895 to 1912, Dugald Drummond headed the Mechanical Department as Chief Mechanical Engineer. Under his direction locomotives increased in size and power, longer fireboxes, inside cylinders unless there were more than two and, they were an extremely robust engine. Drummond had built for his use a small 4-2-4 tank locomotive with a short saloon mounted behind the cab. Unofficially known as "The Bug" it could go like a bird and was used for his tours of inspection. On the four track main line to Basingstoke, an engineman might be loafing along on a peaceful summer morning when stealthily and suddenly "The Bug" would pull alongside, the droplight down and a fierce bearded face glaring out and if there was a drift of dirty smoke, an untidy footplate or a blowing gland, the driver would be sure to hear about it, then and afterwards.

The author admits the South Western was his favorite railway and he has spared no pains with his wealth of interesting facts and details. The illustrations add so much to the story and the two color plates are indeed beautiful. In the appendix will be found such valuable details as the officers and their dates of office, a roster of rolling stock and the engine head signals. All in all, it is a fascinating story of one of the earlier British railways, one that will improve with each reading and valuable for reference.

British Railways in Action; by O. S. Nock. 228 pages, 9 x 6 $\frac{1}{4}$. Illustrated. Distributed by Thomas Nelson & Sons, 19 East 47th St., New York (17), N. Y. Price \$6.25.

As the title implies, this is a story of the British Railways in their daily capacity as carriers and the author takes his reader with him on the foot plate and elsewhere to witness this performance. The

British Railways, like our own, have been criticised for out-of-date equipment, lack of efficiency, etc. without regard as to where the money is to come from and, after it is spent whether other forms of transportation won't be subsidized by the government to the detriment of the railways. What the situation is in Great Britain, is not for the reviewer to state but, this book does present some of the problems those railroads face in the matter of gradients and traffic congestion. Some years ago at Paddington on the Saturday before Whitsun, 23 long distance departures were scheduled between 8:30 and 11:15 A. M., one every $7\frac{1}{4}$ minutes. On a busy Saturday in 1954, between 1 and 3 P. M., 15 down expresses were scheduled passing Whiteball summit one every 8 minutes and, during the same two hours, there were 14 expresses on the up road. And on a bank holiday, not long ago, 83 long distance expresses were scheduled to leave Waterloo Station between 7 A. M. and 2 P. M., one every five minutes and, during this time there were 125 departures of electric trains on the main local lines and 96 departures on the Windsor lines. Our "British Brothers" seem to have plenty of "know how!"

The author takes us into England, Scotland and Wales, we visit traffic centres such as Manchester and York, we ride a locomotive during its testing period, we visit the CTC tower at York and, rather than just watch "The Flying Scotsman" go through simply as a red light, we agree with the author that the place to witness such an event is the gallery outside the tower—a Grantham A-1, Pacific, 60148, "Aboyeur," fourteen cars—a stately spectacle!

To the lover of the steam locomotive and railroad operation, he will find plenty to interest him and the writer, with his intimate knowledge of the subject makes it live. The illustrations are excellent and the colored frontis-piece of the "Duke of Gloucester" on the "Mid-day Scot" is beautiful. I doubt if any other book gives a clearer and a better insight to the workings of the British Railways than does this one and it has been handled in an interesting and masterful fashion.

Cavalcade of New Zealand Locomotives, by A. N. Palmer and W. W. Stewart. 143 pages, $10\frac{1}{2} \times 7\frac{1}{4}$. Illustrated. Distributed by W. S. Heinman, 400 East 72nd St., New York (21), N. Y. Price \$5.50.

While it is true that the average American "rail fan" shows very little interest in the railroads outside of his own country, he is certainly missing something if he passes over the New Zealand Railways. American locomotive builders furnished many of their locomotives and there was one motive power official that had a liking for them.

Following the abolition of the provinces in 1876, the General Government acquired all of the railways and those of broad gauge were soon converted to the present standard of 3'6". One of these railways, the Wellington & Manawatu which was purchased in 1908 by the Government, was equipped with Baldwin-built locomotives and its coaches, brake vans and freight equipment all came from this country. Locomotives 19 and 20, for downright handsomeness, will hold their own with anything that ran on rails in this country.

The first two locomotives for the New Zealand Government Rys. from America arrived in 1878, were of the 2-4-2 type and built by the Rogers Works. Six "consols" arrived in 1879 from the Baldwin Works, very much like those built for the Denver & Rio Grande R. R. In 1879 these works delivered 22 locomotives of the 4-6-0 type that closely resembled those delivered to the Baltimore & Ohio R. R., and thirteen Pacific's from the same builder were delivered in 1901. These are a few of the groups furnished by the American builders.

The New Zealand Railways operate in some pretty rugged country on both islands. In the early days both rails and bridges were light and clearances were limited. In recent years these have been changed to permit larger locomotives and, as listed in our Bulletin No. 81, the road has a large number of Mountain and 4-8-4 type locomotives that will continue to give good service in the years to come despite the inroads of the diesel electric locomotive.

Our members may be interested to learn the road used the Walschaerts valve gear as early as 1874, they were the first British-built locomotives to be equipped with this gear and it was subsequently made standard on the road, the 2-6-2, Prairie type was used as early as 1883, the 4-8-0, Mastodon type was used as early as 1896, the 4-6-2, Pacific type as early as 1901, the 4-8-2 Mountain type as early as 1907 and the 4-8-4 type as early as 1932. No student of motive power could ever accuse the management of their Locomotive Department as being backward.

The book is nicely arranged. A clear illustration of each class heads each page and is followed by an interesting description together with the locomotive specifications. There must be about 125 pages devoted to illustrating and describing the different classes of locomotives. The book is indexed as to class and wheel arrangement and a beautiful colored plate is the frontispiece.

W. W. Stewart is not only the foremost authority and possess the most complete collection of photographs and material on this subject but he can hold his own on other railway matters. This interest and work dates back to 1914. Altho' Mr. Palmer is of the younger generation, his interest covers both the past and present of these railways. This reviewer does not know of a better or a more interesting book that describes the motive power of the railway on both of these islands and it's one that should be of interest to many of us.

The Railroad Station, by Carroll L. V. Meeks. 203 pages, 10 $\frac{1}{2}$ x 7 $\frac{1}{2}$. Illustrated. Published by Yale University Press, New Haven, Connecticut, price \$7.50.

If first impressions are lasting, then there is every reason for a transportation company to make a pleasing impression on the traveler at the outset of his journey. Through lack of capital, and perhaps initiative, the majority of our stations in this country were a sorry sight.

As an associate professor of architecture, the author has presented his book from this viewpoint. It is not a discussion of how many tracks in the train shed or how many trains were operated thereon or of the number of waiting rooms in the edifice. Rather it is a study of the

great stations not only in this country but in Europe also from both an architectural and historical viewpoints. That there was a certain "Railroad style" seems positive.

The author has divided his work into five periods, his discussion is most illuminating and the 231 illustrations supplement the text. The early structures of the European railways were far ahead of ours. Some of the English railways stored their passenger rolling stock in these terminals between trips. What a boon that would have been in this country upon the introduction of steel equipment and prior to air conditioning! Some stations were almost palatial in their construction as well as in their distances and then there were some, like our own Kneeland Street Station that had a "homey" atmosphere to welcome the traveler.

I know of no similar work that has treated or even approached the subject in this way. To gather all of this data, to locate the various designers and to discuss and compare these structures was no small task. The liberal use of illustrations not only aided in the text but told more graphically than perhaps by words what the author meant in his description.

To some, this book may have a very limited appeal but to the "rabid fan" let me call it to his attention that he must go through the station in order to take the train he so admires. Prof. Meeks has made a wonderful study of the subject and is to be congratulated on his work.

Henry Varnum Poor, by Alfred D. Chandler, Jr. 362 pages, 9 $\frac{1}{4}$ x6. Published by Harvard University Press, Cambridge (38), Massachusetts. Price \$6.50.

To those of us who have engaged in the field of railroad research, the name of Henry V. Poor has always been associated with his editorship of the "American Railroad Journal" and the publication of his "Manual of Railroads." It has remained for his great-grandson, author of this book, to recount his life's work and this he has done in an exceedingly interesting fashion.

Henry Poor was born in Andover, Maine, on December 8, 1812. Upon his graduation from Bowdoin College in 1835, he entered the law office of his uncle—Jacob McGaw of Bangor and remained with him until 1849.

On February 10, 1849, he became editor of the "American Railroad Journal" of New York City and for twelve years guided the destinies of that famous paper. Prior to his editorship, the paper was an engineering magazine with George Schaefer, a civil engineer as Editor. Schaefer resigned in 1845 and Poor, upon assuming the editorship hired in July, 1849, M. Butt Hewson, a well trained engineer, recently arrived from England as his assistant. Hewson remained with the paper until about 1853 when he left for the southwest and Zerah Colburn succeeded him. Colburn remained only a short time and although celebrated engineers continued to send in contributions, by 1857 the "Journal" became strictly a financial paper. In the fall of 1860, Poor published his first volume of "History of Railroads and Canals of the United States" which included the states north of Virginia and east of Ohio. The second

and third volumes were never published but the "Journal" did publish the data for the Virginia railroads plus compilations for a few Southern and Western railroads.

In 1861, Poor sold his interest in the "Journal" and became an editorial writer for the "New York Times." He was one of the five government commissioners for the Union Pacific R. R., he was the Secretary upon its formation and the first corporate secretary of that railroad, resigning, along with several other backers upon the management of Thomas C. Durant. He did appraisal work on such roads as the Pittsburgh, Ft. Wayne & Chicago Ry. In company with his son, he formed a partnership for the publication of his "Manual" and the first edition bears the date "for 1868-69, showing their (the railroad's) mileage, stocks, bonds, cost, earnings, expenses, and organizations; with a sketch of their rise, progress, influence, etc." From this time until his death, in 1905, he devoted nearly all his time to the publication of this valuable work, published annually.

Poor had a staunch friend in James F. D. Lanier, member of the firm of Winslow, Lanier & Co., bankers of New York City. Accurate information about our early railroads was difficult to obtain but the reputation of Poor was such that most of the roads were willing to comply with his requests for publication in the "Journal." He abhorred anything that savored of the dishonest and, when the New York Central R. R., formed in 1853, watered its stock to the extent of an 84% stock dividend, Poor denounced the management in no uncertain terms. His "Manual," always a guide to the banker, was the means of keeping some of the roads in "the straight and narrow." If a road declined to furnish the figures requested, a notation to that effect appeared under the heading of that road and, should the promoters need the services of the banker, it was doubtful if any financial aid was given until that statement had been removed and the requested information furnished. Poor welcomed the creation of the Interstate Commerce Commission in 1887, with its uniform system of accounts but, even so, Poor's "Manual" then and today is preferred by some to the lengthy accounts of the I. C. C.

The author has recounted the life of his great-grandfather in a very interesting and absorbing fashion and it is a just tribute to a man who did so much to bring some semblance of accuracy and honesty in the early railroad days of this country. He was a man of which we Americans might well be proud for his pioneer work in the railroad industry.

Steamcars to the Comstock, by Lucius Beebe and Charles Clegg. 100 pages, 11x8. Illustrated. Published by Howell-North Press, 2801 Shattuck Ave., Berkeley (5), Calif. Price \$4.50.

This is a story of two railroads—the Virginia & Truckee and the Carson & Colorado. The story of the former and the wealth and prestige during the boom times of the Comstock and its carriage of precious metals with its final demise is well known. The Carson & Colorado, an off-shoot of the V & T was built "either 300 miles too long or 300 years too soon." Released from V & T control, together with rich mineral wealth in the Tonopah district, the road made money until the Southern

Pacific built their standard gauge tracks into that section. Both roads are now only memories.

The book is beautifully illustrated, two of the illustrations are in color from the brush of Howard Fogg, and these illustrations greatly add to the text. Furthermore, they are not entirely of locomotive or trains but the authors have furnished a wide variety to round out their interesting book. To those of us who like illustrations, and who amongst us does not, they are pretty certain to find this book of interest.

Let's Operate a Railroad, by L. E. Roxbury. 344 pages, 8 $\frac{1}{2}$ x 5 $\frac{1}{2}$. Illustrated. Published by High-Iron Publishers, Warwick, Virginia. Price \$4.50.

The average "newcomer," perhaps "green horn" would be a better word, that goes to work in the Operating Department is usually furnished with a rule book, timetable and safety instructions, is told to study everything carefully and then, as a student, is turned over to some yard foreman, road conductor, fireman or trainman who may or may not have the art of imparting the necessary knowledge to make a good railroad man. Some soon develop a natural reluctance to ask questions after a certain amount of ribbing and then there are some of the instructors that believe the only way to learn is the hard way. This may not always be the safe way.

The author of this book is an experienced railroad man and gained his knowledge the hard way. The entire book is devoted to railroad operation including yard, road and train dispatching. The facts are clearly set forth and are livened with stories and the average person, after reading this book, should have a clearer idea of what makes a railroad "tick" than anything this reviewer has seen published by a railroad. The book is neatly printed in clear bodoni type and the page numbers appear on the side of a locomotive tender, part of a little train on each page. There is a good index and in the appendix is listed the Operating Rules, Train-Order Rules and a Glossary of Terms.

No doubt the railroads could find plenty of excuses for not adopting this suggestion but, this reviewer is of the opinion that the roads could do themselves a great favor if a copy of this book was given to every new employee in the Operating Department, along with the other material. The book is adapted to all railroads and could be the means of filling a much needed gap in the training of these new men. To the average "railfan" and the model railroad builder, this book should be of especial interest. The task of preparing this material has not been an easy one and the author deserves a lot of commendation for his efforts.

Steam Locomotive, by O. S. Nock. 230 pages, 8 $\frac{1}{2}$ x 5 $\frac{1}{2}$. Illustrated. Distributed by The Macmillan Co., 60 Fifth Ave., New York (11), N. Y. Price \$5.75.

The author of this book should need no introduction to our membership as he is one of the foremost as well as authoritative authors on the subject of the British railways.

The volume starts with the opening of the Stockton & Darlington Ry., on September 27, 1825 and concludes with the close of World War II

in 1945. In the intervening one hundred twenty years, there was a lot of railway history that took place in the British Isles. The book is packed with facts, it is well indexed and beautifully illustrated not only with locomotives but portraits of the men that designed and built them. One of his most interesting chapters is the one entitled—"Locomotive Men at Work."

The author writes very easily but surely and convincingly. Mechanical details have been purposely omitted but, when writing of a specific class or type there is enough description included to identify that group and place it with contemporary locomotives. He goes into great detail over the racing of trains on the East Coast and West Coast routes in the 1890's. But he also reminds us that it was one of the Dean singles, 4-2-2 type, No. 3065, "Duke of Connaught" on the Great Western Ry., on May 9, 1904, with an Ocean Mail special, covered the 70 $\frac{1}{4}$ miles from Shrivenham to Westbourne Park in 52 $\frac{3}{4}$ minutes—an average speed for this entire distance of exactly eighty miles an hour!

British railway management, operation and construction of rolling stock differs greatly from that on our American railroads. To those of us that were once associated with a railroad and are still interested in them, this book affords us, at least, a basis for some interesting comparisons, especially in the assignment of crews to their locomotives. But the author has hewn a straight line from 1825 to his closing date and has recounted the many important men and events that took place during these years. His graphic descriptions, together with his wide knowledge makes this book far from dull for, after all, our first locomotives came from England, good little ones they were too and it is of interest to follow their development and you won't find a much better book or a more interesting one than this one on this subject.

Harold D. Forsyth

It is with deep regret that we record the passing of Harold D. Forsyth, Secretary of this Society, on June 23rd last.

Harold graduated from Lowell "Tech" in 1924 and then entered the employ of William Forsyth & Sons Co., Lynn, Massachusetts, manufacturers of cutting board and dinking blocks and was the treasurer of the concern at the time of his death.

Born in 1900, when rubber tired vehicles were not as common as now and a nickel, amongst other things, would pay for a long journey on a street car, he became interested and was an authority on the early street car lines in eastern New England. His recollections and his descriptions of the equipment of rolling stock were vivid. But these interests did not detract from his interest in railroads and perhaps his favorite road was the Pennsylvania.

Altho' he held the office of Secretary only eight years, the affairs of the Society were conducted in a most exemplary manner. He will always be remembered for his finishing the records of several of the locomotive builders and his contacts with one of them was especially valuable. He never missed an Annual Meeting of this Society and he made a special effort to be present at the one held last May. Many of us knew he suffered from heart trouble and that he was far from well but none of us realized that this was to be his last meeting. His gentleness, kindness, keen wit and sense of humor endeared him to all of his friends. We have lost a comrade as well as a faithful officer and he will be sorely missed.

In Memory of

JOHN D. ALDEN
Annual Member

40 Lexington St., Newark, N. J.
Who Died on May 27, 1956

TOLBERT F. FRITZ
Annual Member

1003 New Holland Road, Reading, Pa.
Who Died on January 6, 1957

F. GAISER
Annual Member
Unterfr., Germany
Who Died in 1956

GERALD M. PAULMIER
Annual Member
60 Fernwood Road, East Orange, N. J.
Who Died in 1956



